The RUBBER AGE

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Late News of the Rubber Industry

General Tire Reports 50% Unit Output Gain

THE General Tire & Rubber Company in a report issued September 12 announced a sales increase of 16 per cent and a unit production gain of 50 per cent for the first nine months of their fiscal year which ends on November 30. The General company will finish the present year, according to William O'Neil, president, with more tires manufactured, larger sales and greater cash receipts than in 1927, when its annual statement showed that it had made the greatest percentage of sales gains in the rubber industry.

"With assurance of a smashing big business for the final quarter of the fiscal year," President O'Neil declared, "our 1928 increase over last year will be limited only by the inability of our production departments to go beyond their capacity outputs."

The company now has all departments operating at capacity and has business already on the books for the next three months sufficient without any additional orders to show sales for the final quarter of the fiscal year far ahead of that done in the last quarter of the preceding year.

Hood Rubber Company Shows $1,534,000 Loss

FOR the first six months of 1928 the Hood Rubber Company showed a loss, before paying $464,000 in dividends, of $1,070,000 on the basis of writing crude rubber on hand June 30 down to market prices. The company does not make semi-annual statements, but this report is for the purpose of revealing progress of affairs.

Sales for the half-year were about the same in units as in 1927 though less in dollar value because of lower selling price levels. Sales for July and August were larger in units and approximately the same in dollar value as for the same months last year, making the outlook for the balance of 1928 encouraging. Footwear orders on hand are larger than a year ago, and the trend of buying is stronger. Inasmuch as about two-thirds of the company's business is in footwear, an early winter with a big volume in that line would probably mean that it would close its books for 1928 with only a moderate loss for the entire year.

Finished goods inventories are low and, as has been customary since 1920, are being kept each month within predetermined limits set by budgets. At the present time inventory is below the set budget both in amount and cost as related to selling prices. The dividend payments made during the first half of the year include the $1 declaration of March 3 on 200,000 common shares which would have been omitted had the collapse in crude rubber been evident at that time.

Semi-Annual Survey of Tire Dealers' Stocks Begins

THE Department of Commerce is preparing to launch its semi-annual survey of tire dealers' stocks with the usual questionnaire to be sent to over 100,000 dealers on October 1. The preliminary returns are expected to be available for publication by October 20.

Last October the returns, based upon 33,548 answers, showed that the average dealer was holding 55.9 tires and 100.7 inner tubes in stock. On April of the current year the average stocks stood at 81.2 tires and 123.4 tubes, a record peak in the history of the tire industry.

A strenuous effort is being made at this time to secure a higher percentage of returns from dealers and all recipients of the questionnaire are being strongly urged to reply. The compiled results of these semi-annual surveys form the best index to conditions not only within the retail tire trade but also from the standpoint of the manufacturing industry.

Rubber Consumption in August Breaks All Records

THE consumption of crude rubber by American manufacturers last month broke all previous records in the history of the rubber industry and soared to a peak of 42,925 tons, exceeding the former high record established in June by 5,249 tons. It was generally conceded that a high record would be made, but the actual figure exceeded all expectations.

This total brings the amount of rubber consumed for the eight months of the current year to 291,907 tons as compared with a total of 264,738 tons for the corresponding period of 1927. The total consumption figure is all the more interesting in the light of the marked decline in crude rubber imports for the same period. In August only 29,805 tons came into the United States and for the eight months of the year a total 275,684 tons is reported to have arrived. This last figure is 16,223 tons less than the amount consumed during the same eight months and reg-

isters a decline of 22,901 tons as compared with the arrivals during the same period of 1927.

The figures are based on the report of the Rubber Association of America, Inc., and are brought up to represent 100 per cent of the industry. The report also shows a substantial reduction of stocks of crude rubber on hand, the total at the end of August being 64,994 tons as compared with 83,242 tons at the end of July and 96,148 tons at the end of August, 1927. Stocks afloat, however, showed an increase from the July figure and totaled 51,875 tons, bringing the total tonnage on hand and afloat to the United States to 120,869 or only slightly less than the total of 125,546 tons on hand and afloat at the end of July.

The consumption of reclaimed rubber in August amounted to 15,532 tons, only a slight decrease from the figure of 17,173 tons used during July, but the ratio of reclaimed rubber used to the total crude rubber declined from 45.9 in July to 36.2 per cent.

In the face of this heavy consumption in the United States, which is reported to be holding well up during the current month also, and the decline in imports, stocks in London reached a new low level of 31,477 tons. Reports from rubber manufacturing centers in Europe would indicate an increasing consumption of rubber in practically every instance.

Rubber Section, N. S. C. Announces New York Program

THE program of the rubber section of the National Safety Council Congress which will be held in New York City, October 1-5, has now been tentatively announced.

The speakers include R. G. Knutson, of the Industrial Commission of Wisconsin, whose subject will be "Safety Moves Forward and Why"; F. J. Hoxie, of the Associated Factory Mutual Fire Insurance Companies, Boston, Mass., who is to talk on "Static Electricity" as it relates to fires in the rubber industry; G. W. Cook, supervising engineer, Travelers Insurance Company, Hartford, Conn., whose probable subject will be "Control of Those Low Frequency High Severity Accidents." An effort will be made to secure S. P. Thatcher, of the United States Rubber Company, for an inspirational address. Walter S. Smith, manager of the safety division, Milwaukee Association of Commerce, is to speak on the subject of "Ramifications of Safety Interest."

From all accounts the rubber section at the congress will be widely represented and an interesting program is assured.

Goodyear Still Balked In Naval Dirigible Award

COMING on the heels of the assurance from the Navy Department at Washington that the award of the two navy dirigibles would be made in favor of the Goodyear-Zeppelin Corporation, the government now advises that in view of a protest filed by the American Brown-Boveri Electric Corporation, one of the other bidders on the naval contract, there will be a further delay in the final issuance of the award. The protest of the Brown-Boveri concern is against the recent report of the Naval Dirigible Board which ranked the bid of the Goodyear Company first and that of the Brown-Boveri Company third. There is hardly any doubt, however, that Secretary Wilbur will sign the contract of award in favor of the Goodyear Company within the next few weeks, thereby closing an incident which has been the cause of a tenacious fight on the part of the Goodyear-Zeppelin Corporation for the last two years.

Miller Rubber Co. Enters British Field

THE Miller Rubber Company, Akron, O., has joined the other larger American rubber manufacturers in entering the British competitive field for the manufacture of automobile tires, according to an announcement recently made by the company.

The entrance of the Miller Company into Great Britain will be accomplished through an agreement with the Industrial Rubber Manufacturers, Ltd., of England, whereby the latter firm is licensed to manufacture Miller tires for distribution within the British Isles and to British possessions. By this connection the arrangement differs from that under which other American tire makers have entered the British field, but will be no less effective in enabling the Miller Company to meet competition without the heavy initial investment necessitated by the establishment of its own manufacturing facilities in England.

Five American tire manufacturers now have their own factories in England.

"BB" Rubber Contracts on the Rubber Exchange

ALTHOUGH the recent amendment to the rules of the Rubber Exchange of New York, permitting trading in certain grades of blanket crepe and ambers was heralded as a progressive step and one which would allow of a wider range of rubber trading, and although such tradings under the new "BB" contracts have been available to members of the Exchange since September 1, to date only 8 contracts have been handled. Six of these transactions were handled the first day of trading and only two since.

It is reported, however, that this seeming lack of interest is not due to an absence of demand but to a genuine shortage in spot or nearby supplies. Futures in these grades at the present prices and in the light of the general uneasiness of the market are not so attractive.

London Grows Nervous As November 1 Approaches

WITH the end of restriction drawing daily nearer, the influence of heavy supplies awaiting shipment in the East is being felt in Mincing Lane. Notwithstanding the bear factor, the market looks for a rise in the spot price temporarily in view of the probable scarcity of supplies before heavier shipments begin to arrive. Compared with the peak level of 66,285 tons at the beginning of the year, London stocks now stand at 31,447 tons, the lowest point for this time of the year since 1925. A noteworthy feature in this connection is that on only seven occasions during the present year have weekly arrivals exceeded deliveries. The present London stocks are considerably below American consumption figures for any one month this year.

It is thought that probably in the near future the spot price will react to the statistical position. Any sharp rise in the spot position would result in near positions being neglected. A period of slow trading would then perhaps be seen. The uncertainty of the condition is keenly felt in London, and the situation is aggravated by the lack of any central selling organization, which in a time like the present would be of vital importance. Plantation amalgamations continue in a small way, but it is felt throughout Mincing Lane that a broader scheme of cooperation and policy is needed.

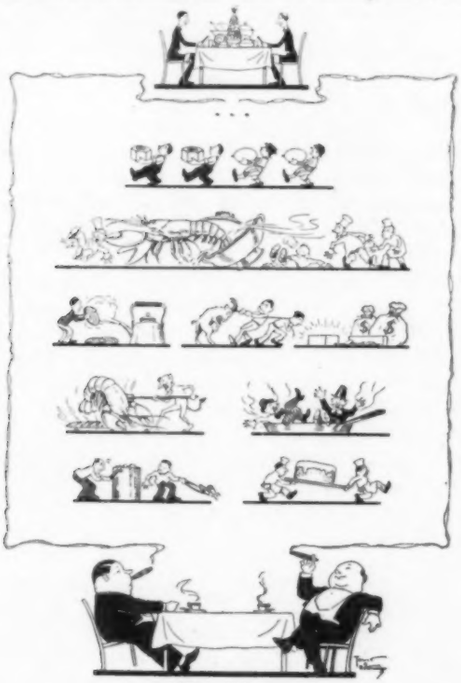
Rubber Division, A. C. S., Holds Annual Fall Conference

More Than 300 Members and Guests of the Rubber Division Attend Meeting at Swampscott and Participate in Yearly Election, Banquet and Presentation of Technical Papers

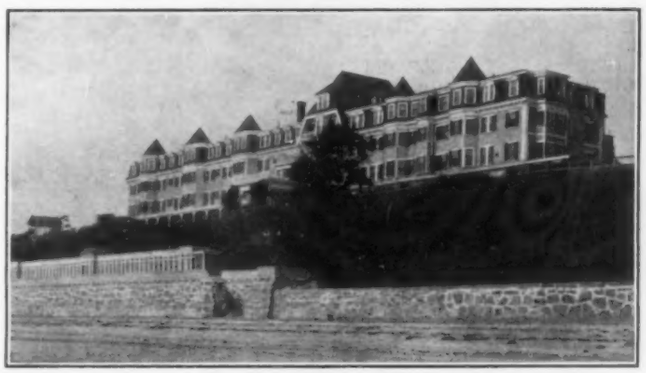
THE Seventy-Sixth meeting of the American Chemical Society under the auspices of the Northeastern Section, held at Swampscott, Mass., September 10 to 15, was the occasion of one of the largest attendances of rubber chemists and technologists and the most elaborate program by the Rubber Division in the history of the Society. Of the approximately 2,000 members of the Society who journeyed to Swampscott fully 300 registered as members and guests of the Rubber Division.

The main headquarters of the Society were at the New Ocean House, where all of the general meetings and most of the social activities were held. The Rubber Division, however, maintained separate headquarters at the Hotel Preston, where all the divisional meetings were scheduled. All sessions of the rubber group were well attended. That the various papers read at the meetings were well received was best evidenced by the prolonged discussions which followed the submission of a number of these papers and the interest shown by the members as a body.

No more beautiful a spot could have been conceived as a place to hold such a conference at that season of the year. Both the New Ocean House and the Hotel Preston, overlooked the sea and were the last words in point of service and hotel accommodations. Swampscott, itself, situated along the finest stretch of the Massachusetts coast, offered an attractive setting for the occasion. There was ample opportunity for the members and their families to enjoy the ocean bathing. Numerous golf courses were available, and the many miles of fine automobile roads added to the pleasure of the many members who came by machine.



The Menu



The Hotel Preston, at Swampscott, Mass., where the Sessions of the Rubber Division, A. C. S., Were Held

The program of the Rubber Division, as given in the last issue of THE RUBBER AGE, consisted of 24 papers, including those read in conjunction with other divisions but pertaining to the general subject of rubber. All of the papers scheduled were read with the exception of the one submitted by S. E. Shepard, although their presentation was not in the same order as on the program. A great number of the papers were illustrated by lantern slides and charts. Several of the papers, following their formal release by the Society, will be reproduced in full in subsequent issues of THE RUBBER AGE.

Dr. Harry L. Fisher, chairman of the Rubber Division, at the business meeting held on the morning of September 13, reported on the general progress which had been made by the Division during the past year and spoke particularly on the development and cost of the first issue of the journal of the Division, "Rubber Chemistry and Technology," and the cordial reception which it had at the hands of the industry. He said that, in view of the fact that the first edition had been entirely exhausted, any members having extra copies would confer a favor if they would return them so that others in the industry who had made requests for copies could be supplied.

At the end of the sessions on Thursday morning, September 13, the committees on Physical Testing and Raw Rubber Specifications, headed respectively by J. E. Partenheimer and E. B. Spear, made brief reports which will occupy a prominent part of the November issue of *Industrial and Engineering Chemistry*.

New officers elected for the ensuing year include A. H. Smith of the Rubber Service Laboratories Company and formerly vice-chairman of the Division, as chairman; and Stanley Krall, of the Fisk Tire Company, as vice-chairman. H. E. Simmons, of the Akron Municipal University, who held the office of secretary so ably last year, was reelected. The election followed the report of the nominating com-

A. H. SMITH

Elected Chairman of the Rubber Division, American Chemical Society, for the Ensuing Year

mittee, headed by W. W. Evans, of the R. T. Vanderbilt Company, which prepared the list of names of the proposed new officers to be voted upon.

A handsomely bound program, prepared by the Northeastern Section of the American Chemical Society, under the direction of a committee headed by C. R. Boggs, was one of the valued souvenirs distributed to all members. The book was richly bound in DuPont Fabrikoid imitation leather, and opening with the complete schedule of meetings and social activities, gave an entertaining story of Massachusetts and the country surrounding Swampscott. It also included biographies on the leading New England chemists who in the past have been illustriously identified with the chemical industry and research in America.

The program of the Rubber Division closed with the banquet attended by over 200 members, guests and their wives, held at the Adams House, Marblehead, approximately 3 miles north of Swampscott.

Dr. Fisher, again acting as chairman of the Division, welcomed the members and guests in a short and pleasing address and introduced John W. Bierer, as the toastmaster of the occasion. The first speaker was Dr. C. C. Parsons, Secretary of the American Chemical Society, who reviewed the growth of the Rubber Division and prophesied a long and continuously useful life for the organization. He was followed by Dr. H. E. Howe, editor of *Industrial and Engineering Chemistry*, who offered co-operation of the Society's various journals to the Division. Another entertaining speech of the evening came from Jocelyn Thorpe, president of the Chemical Society of London, who spoke on "An Englishman's Impressions of America." Mr. Thorpe had recently visited many of the industrial plants of the United States and gave his observations in an interesting fashion.

The last speaker on the program was John Nicol Mark, a well-known Scotch minister and a brilliant after-dinner talker, who kept his listeners in a continuous roar of laughter. The serious part of his address was devoted to "The Tombstones of Success" in which he told of the successful methods of well-known men of the past and present. The Concorde Male Quartette rendered a pleasing selection of music during the evening.

The dinner itself consisted of a typical New England shore-dinner, excellently prepared and well served. The menu card attracted a great deal of favorable comment, especially the menu itself, which is reproduced on the previous page. A solution of the cleverly conceived idea is given on this page. The dinner committee, headed by John W. Bierer, of the Boston Woven Hose and Rubber Company, and including C. R. Boggs of the Simplex Wire and Cable Company, and Thomas Knowland, of the Hood Rubber Company, deserves much credit for the great success which attended the banquet and ended a highly enjoyable and profitable three days of conferences and social gatherings.

MENU

Nuts **Olives**
Lobster Chowder
Steamed Clams **Clam Bouillon**
Drawn Butter
Deviled Lobsters
French Fried Potatoes
Ice Cream **Cake**
Coffee **Cigars**

Solution of the Original Menu Design as Reproduced on the Previous Page

NEW OFFICERS

Rubber Division, A. C. S.
1928-1929

A. H. SMITH, *Rubber Service Laboratories Company*
Chairman

STANLEY KRALL, *Fisk Tire Company*
Vice-Chairman

H. E. SIMMONS, *Akron Municipal University*
Secretary

EXECUTIVE COMMITTEE

HARRY L. FISHER, *United States Rubber Company*
E. R. BRIDGWATER, *E. I. DuPont de Nemours Company*
S. CALDWELL, *United States Rubber Company*
C. W. SANDERSON, *Goodyear Tire and Rubber Company*
H. A. WINKLEMANN, *Philadelphia Rubber Works Company*

Vinegaire Tar

THE R. T. Vanderbilt Company of New York has recently put on the market a new softener known as Vinegaire Tar. It is a uniform tack producing softener prepared and dehydrated under careful temperature control, and has the following physical properties:

Moisture—Not over 2%
Sp. Gr. at 30°C.—1.14
Weight per gallon—9.5 lbs.
Color—Black
Viscosity—Flows freely at room temperatures
Odor—Not so pronounced as that of most tars and dissipates more quickly

According to its producers, Vinegaire Tar mixes readily in rubber. It aids in the cure similarly to stearic acid on account of its high percentage of those natural resin acids desirable in a properly balanced compound. Although it is a good softener for uncured rubber it does not make a soft dopey cured stock, but instead it gives a high modulus in cured rubber. On account of its high resin acid content and its ability to assist in the cure, Vinegaire Tar is said to be able to replace a portion of the stearic acid in a compound to eliminate any stearic acid bloom.

Vinegaire Tar is a good ager as it offers some slight anti-oxidant protection.

The manufacturers believe that Vinegaire Tar will fill a real need in the industry on account of its uniformity and its good curing qualities.

The New York Group of the Rubber Division, American Chemical Society, will hold the first of its Fall and Winter series of meetings on the evening of October 10th at the Town Hall Club, 123 West 43rd Street, New York City, at 6:30 p. m.

Arbitration *in* Rubber Trading

The Rubber Trade Association and the Rubber Exchange of New York Arbitrate All Disputes Between Members Through Their Own Arbitration Committees

By FRANCIS R. HENDERSON
President, the Rubber Exchange of New York, Inc.,
and
Vice-Chairman, American Arbitration Association.

Francis R. Henderson

OUR experience in the crude rubber industry in regard to commercial arbitration goes back a good many years. Prior to the enactment of the New York State Arbitration Law in 1920, arbitrations were held somewhat as follows:

When both parties to a dispute would agree to arbitrate (this agreement was often difficult to obtain) each side would appoint an arbitrator—and quite naturally it would be one who was friendly disposed—and then these two arbitrators would appoint an umpire or referee. This meant that each of the arbitrators chosen by the parties would be partisan to the disputant who had chosen him as arbitrator and the final decision, instead of being the sound judgment of three able men as a unit, would depend on which arbitrator had been able to persuade the umpire (or referee) to his side of the controversy. Naturally, there was no time limit as to when a decision would have to be reached by the arbitrators, and cases would often drag on for months before an award or decision was rendered. In addition to this delay, after the rendering of a decision it was very often necessary to resort to the courts, because there were no other means of enforcing the decision.

Arbitrate Under State Law

After the New York Arbitration Law was enacted, and following the lead of other trade organizations in New York, the Rubber Trade Association set up the necessary by-laws, rules and forms to conform to the State Law and thereby reap the benefits the law offered to business men and organizations. These by-laws provide that the party applying for arbitration shall execute in duplicate a "Submission" in the form provided by law and one copy thereof shall be filed with the clerk of the arbitration committee of the Association. An exact copy of the "submission" shall also be furnished at the same time to the party with whom arbitration is requested. The party against whom the arbitration is called shall make his answer to the arbitrators, who are appointed by the arbitration committee on receipt of the "submission," properly executed, and who are not necessarily members of the Association, within five days thereafter. Should there be any objection to the arbitrators appointed, the parties may, within two business days after the mailing of the notice of appointment of the arbitrators, forward to the committee such objections in writing. After receipt of such objection the committee shall finally designate the arbitrator or arbitrators, and give the parties written notice of such designation. Unless otherwise provided by the terms of the "submission," the arbitrators shall make their award within ten days after the final hearing, unless within that time they, or a majority of them, give written notice to all parties naming an extension of time for making the award.

The award of the majority of the arbitrators shall be binding upon the parties, unless they, or either of them, within three business days after the award is delivered or mailed, lodge with the arbitration committee a written notice of appeal, and serve a like notice upon the other party or parties. Upon appeal, the arbitration committee shall review the award and the record, and shall determine the rights of the parties, rendering, if they deem it expedient, a new award. This decision shall be absolutely final and binding upon all parties to the controversy, and must be complied with immediately.

The penalty for failure to abide by and perform an arbitration award may be, within the discretion of the board of directors of the Rubber Trade Association, suspension or expulsion from the organization. In addition to this, under the New York Arbitration Law, such awards may be filed in the New York Supreme Court and a judgment entered against a delinquent in due course.

Final Awards Have Legal Status

The Rubber Trade Association advises that a standard arbitration clause be inserted in contracts, providing for the settlement of disputes arising thereunder by arbitration under the rules of the Association. The clause, however, is not compulsory, and disputes under contracts not containing such a clause are also arbitrable under the rules of the Association. The text of the clause is:

> "To avoid all doubt as to whether arbitration is obligatory, the following clause should be inserted in the contract: All claims and controversies arising under or in relation to this contract shall be determined by arbitration conducted under the By-Laws, Rules and Regulations of the Rubber Trade Association of New York, Inc."

The above clause is used in addition to the fact that all active and associate members of the Association upon elec-

tion to membership, agree to submit their differences to arbitration and to abide by and perform the award.

The arbitration committee of the Association deals with all disputes arising out of contracts, save those relating to the quality of the merchandise. The committee is empowered to appoint arbitrators, to determine differences arising as to matters of procedure not expressly covered by the rules, and to decide questions concerning interpretation and application of the rules. The committee also acts as an appeals committee and may review an award and render a new one. In such cases the rights and powers conferred by the rules on the arbitrators, are conferred on the arbitration committee. The committee now consists of F. H. Peaty, Chairman; R. L. Baird, W. H. Dickerson, E. Stevenson, W. H. Stiles, J. L. Handy, C. T. Wilson and B. W. Henderson. Four members of the committee constitute a quorum.

LUCIUS R. EASTMAN

President of the American Arbitration Association Who Has Been Prominent in Promoting Arbitration in Commercial Disputes

Considering the large number of contracts which have been executed since the adoption of "Rules Governing Arbitration," on December 1, 1923, it has been most gratifying that so few disputes have reached our Court of Arbitration. It is also noteworthy that so few decisions went to the Board of Appeals. In that time only twenty-four arbitrations, concerning matters other than quality, have been held. Six awards were appealed, and of these six, four original decisions were affirmed and only two were modified slightly.

Controversies involving quality come under the jurisdiction of a Panel of Quality Arbitrators. The rules for the Panel of Quality Arbitrators provide for official samples to be prepared and adopted by the Panel; for formal submission of the dispute to be made; for method and cost of sampling; for cost and establishment of fees for the arbitration; for arbitration between non-members; for the method of rendering decisions according to whether the contract in question is a standard quality contract or not; for appeal from the award; and procedure in case of failure to comply with awards, including the right of a party, in the event of a firm refusing to abide by the decision of the Quality Panel, to request confirmation of the damages, thus giving legal effect to quality decisions. No submission form is necessary for quality disputes, as a sample of the delivery, drawn jointly, and sealed and signed by the representatives of the buyer and seller, together with the type sample upon which the sale has been made, is sufficient for the arbitrators in determining the quality of the delivery.

When the Rubber Exchange of New York, Inc., was organized in the beginning of 1926, similar by-laws to those of the Rubber Trade Association were incorporated in the Exchange Regulations. Considering the volume of business done on the Exchange the number of disputes is likewise surprisingly small. A conservative estimate of the imports of crude rubber into the United States in 1926 is 390,000 tons, with an approximate valuation of $330,000,000. In six and a half months of 1926, from February 15th to September 1st, 37,401 contracts, involving 93,502½ tons, were traded on the exchange. In these, nearly 40,000 contracts, it is worthy of note that we had only 1 arbitration on contract interpretation and 21 arbitrations on quality disputes.

From September 1, 1926 to August 31, 1927, 72,000 contracts were traded in, and this represents about 180,000 tons with a value of something over $150,000,000. In all these transactions no contractual disputes occurred. There were 53 disputes regarding quality involving 520 tons. The Quality Appeal cases amounted to 8, involving 72½ tons.

Much has been written by those active in the promotion of arbitration in industry, in relation to the saving in time as against the old-fashioned method of resorting to court action and the attending delays, as compared with the quick settlement provided through arbitration procedure. To my mind, however, the big contribution to industry is the fact that every dealer or trader recognizes that his contract is protected through compulsory performance, and the very knowledge that both parties to the contract will be compelled to abide by an equitable settlement of any dispute is, in itself, an incentive for proper performance.

The American Arbitration Association is the only organization in the United States whose activities are devoted entirely to the promotion of the use of commercial arbitration and in extending state arbitration legislation. New York, New Jersey, Massachusetts, Pennsylvania, Oregon, California and quite recently, Louisiana, all have passed modern comprehensive arbitration laws. The work of extending this list of states is being competently carried forward by the American Arbitration Association under the leadership of such men as Herbert Hoover, Charles Evans Hughes, Newton D. Baker and others as Honorary Presidents, and under the active direction of Lucius R. Eastman, as President. The Association is non-profit making, devoting all its funds to the work it is doing.

Appended are the abstracts of two typical cases involving the arbitration of disputes arising out of rubber trading transactions. These are actual cases with the names of the original parties omitted for obvious reasons.

Docket No. 850—Arbitration Committee
Rubber Trade Association of New York, Inc.

Nature of the Dispute

The claimant company (buyer) insists that the respondent company (seller) remove certain wooden markers from a lot of rubber before it accepts delivery of this rubber. The selling company argues that this is not customary and offers alternative courses of action.

Positions of the Parties at the Hearing

The particular rubber in question was Para rubber known as Caucho Balls. This rubber is received in large balls. Into these balls wooden markers are put to facilitate identification. After the rubber was received in New York, the respondent company before selling it wrapped it in burlap for shipment within the United States. The markers were not removed. The rubber was then delivered to the claimant company which had previously entered into a contract for its purchase. There is no dispute as to the quality of the rubber.

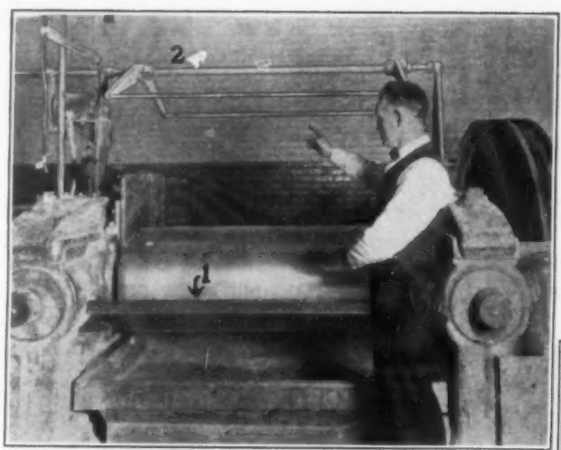
A representative of the A. Company, claimant, testified that he had previously purchased this same type of rubber from another company and that this company had agreed to remove the wooden markers before delivering. He testified further that a certain broker had said that it was the custom of the trade to remove the markers when

(*Continued on page* 689)

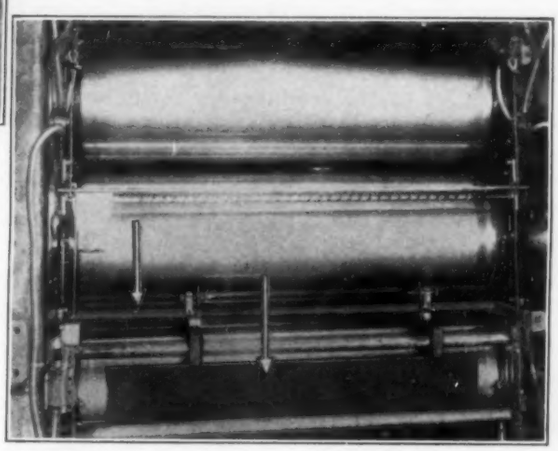
SAFETY KINKS *for the Rubber Factory*

No. 5 of a Series, Showing How Various Manufacturers Are Protecting Their Workmen Against Serious Accidents. Presented by Courtesy of the National Safety Council and with the Cooperation of the Rubber Section thereof.

THE illustrations above show the safe and approved method of trucking rubber in the factory and the unsafe and condemned method. Note the dangerous position of the trucker's feet in the right hand picture. The photographs shown were taken in the Detroit plant of the United States Rubber Company. Numerous plant accidents in rubber factories are attributable to the mishandling of trucks and conveying equipment.



THESE two lower illustrations show several safety devices on rubber calender rolls. The above photograph shows one of the rubber mills in the plant of the Firestone Tire & Rubber Company with (1) safety bar in front of roll and (2) switch and hand rest at the top. The photograph at the right shows a safety bar at the bite of a calender roll in the Detroit factory of the United States Rubber Company.



Can you use these ideas to make your plant a safer place in which to work? See other "Kinks" in succeeding issues

Transportation *of* Liquid Latex

The Use of Liquid Latex is Increasing Yearly in Such Volume as to Make Its Transportation a Question of Prime Importance—Calls for Special Equipment

THE obvious advantage of using liquid latex as a commercial form of crude rubber has been ever present in the minds of both growers and rubber goods manufacturers, but the problem of successfully transporting the latex without coagulation or deterioration for a long time was unsurmountable.

The first use of rubber in the form of latex dates back to the first half of the sixteenth century. In 1536 Spanish invaders became acquainted with rubber in the Americas and missionaries utilized latex in water-proofing fabrics.

The first large experiments toward commercializing the use of latex in America were started by the United States Rubber Company in 1909 to 1914. These shipments at that time were all made in five gallon tins, but shortly thereafter drum shipments of the product were successfully accomplished by the same company. By 1919-1920 the use of latex in America had become of sufficient importance to make necessary the study of a more economical method for stabilizing and transporting it in quantities. It was at this time that the United States Rubber Company, through the General Rubber Company and the United States Rubber Plantations, Inc., attempted bulk shipments in steamer tanks.

The latex collected at the plantation was emptied into large ordinary tanks which were hoisted on railway cars and shipped to the coast, where they were in turn hoisted to the deck of the vessels and emptied into steamer tanks. Repeated difficulties were encountered not only in proper preservation of the latex but in details of handling. By 1923, however, this had been sufficiently solved by the use of ammonia as a non-coagulating agent so as to make possible the stabilization, storage, and effectual transport of approximately 500,000 gallons during that year.

Shipments Have Steadily Increased

Since 1923, the volume of shipments of liquid latex has steadily increased until they reached a total of approximately 2,524 tons in 1927, a slightly lower figure from the peak record of 1926 amounting to 3,327 tons. Shipments coming forward during the current year, however, threaten to exceed the 1926 figure. The United States Rubber Company has shipped from the Far East approximately 600,000 gallons during the last two months,—July and August, 1928.

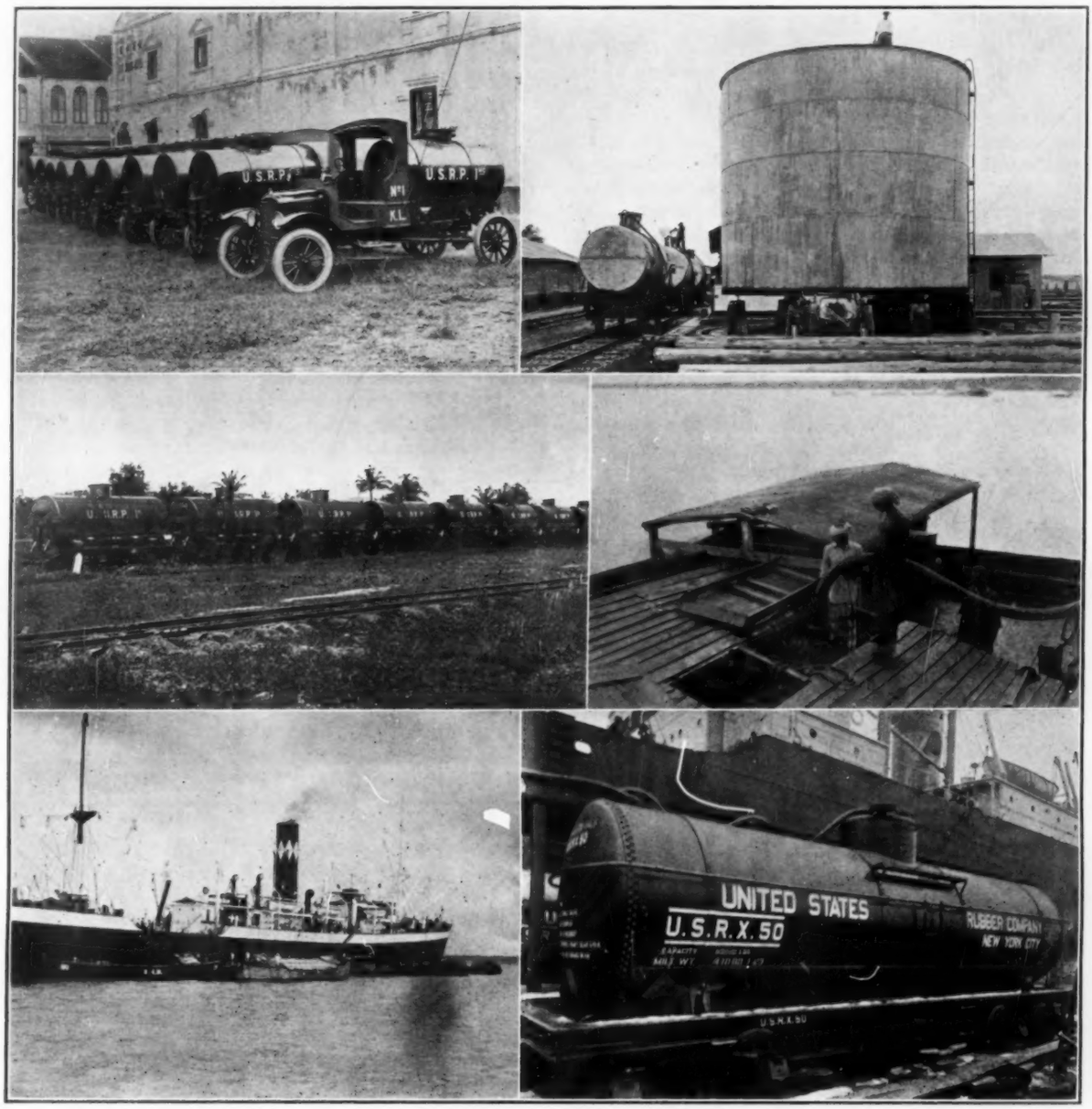
In this problem of latex transport the following equipment is employed in the Far East: field collecting tanks, motor lorry tanks, railroad storage tanks, railroad tank car transport wagons, seaport storage tanks, harbor lighter transport tanks, all with the necessary piping, valves, and hose equipment required in order to move the commodity. Prior to storage in the field collecting stations, the latex is treated at the time of tapping the trees with a stabilizer, such as ammounia, in order to prevent coagulation. A rather high degree of mechanical stability must, of course, be maintained with the latex during the various stages of handling which it must pass through from the Far Eastern plantations to ultimate consumer in America. From the coastal land storage tanks and from the harbor lighter transport tanks, latex is moved through 6-inch or 4-inch pipe lines into the hold tanks of carrying steamers. These steamer tanks have been specially equipped by the United States Rubber Company for the transport of this product. Upon arrival of steamers in New York, barges carrying standard sized railroad tank cars of 8 and 10,000 gallons capacity each, are moved alongside and by means of gravity flow and specially equipped pumping apparatus the latex is taken from the steamers. The tank cars are then dispatched direct from the steamer's side to the various latex consuming factories. The United States Rubber Company now operates 80 of these tank cars over domestic railroads.

Uses of Liquid Latex

The use of crude rubber in the form of latex is in its infancy notwithstanding the appreciable quantities of this material now being imported into the U. S. A. The chief use for latex at present is in web cord tire manufacture, although appreciable quantities are now being used in the manufacture of automobile tubes in semi-commercial units now operating in some of the United States Rubber Company's factories. Another large use for latex is in the can sealing industry where a latex sealing compound is rapidly replacing paper and rubber washers and rubber solution cements. Latex cements are also used extensively in the shoe industry and a constantly increasing amount of latex is being utilized in the paper industry, in leather substitutes, shoe sole manufacture, and in many lines of imitation leather goods.

Recently, new processes being evolved in the manufacture of certain rubber goods promise a more extensive use of latex than ever before. The United States Rubber Company has developed an inner tube made from latex by a

dipping process and is understood to be working on a latex tread for casings. The B. F. Goodrich Company is reported to be securing excellent results from an electro-deposition process known as the Anode process in the manufacture of various classes of rubber goods. As was pointed out editorially in THE RUBBER AGE of August 10, 1928, the increasing use of liquid latex in rubber manufacturing in the treatment of latex to permit it to be successfully transported without deterioration or coagulation is credited in a large measure to Ernest Hopkinson, vice-president of the United States Rubber Company, who devoted many years to the research work and under whose direction many other scientists of the company worked on various phases of the problem. The chief problem in the early



Top Row: Field Collecting Tank Trailers on the Plantation and Central Storage Tanks.
Middle Row: Tank Cars of Latex on the Plantation Enroute to Coast Where the Latex is Piped Into Lighters as Shown.
Bottom Row: Lighters at the Ship's Side Delivering Latex; Steamer Delivering Latex to Tank Cars on Arrival at New York.

and the consequent increase in the transportation of rubber in the latex form may have far-reaching results on rubber trading. The question of successful transportation of rubber in liquid latex form has now been solved and it is not improbable that a gradual decline in the use of coagulated rubber and the ascendency of latex is not far distant.

The accompanying illustrations show in sequence the various steps in the handling of liquid latex from the plantations of the United States Rubber Company in the Far East to the domestic market. The present process used stages of the matter lay in the development of an agent to prevent coagulation and thus preserve the latex until it had reached the consuming market. A great many chemicals were tried but ammonia seemed to effect the desired results in the best and most economical manner.

As a result of his long and thorough researches Mr. Hopkinson finally evolved many phases of the system under which the company is now successfully transporting latex and in addition, and as a direct result of his experiments, he has developed a number of processes for using latex.

Schaphorst's CHATS *with the* ENGINEER

By W. F. SCHAPHORST, M.E.

It Can Be Done

MANY things are now being done that were in the "can't-be-done" class not so long ago, within the memory of all of us.

"Glass cannot be made in a continuous sheet," said the glass experts to a big automobile manufacturer only two or three years ago. But the automobile manufacturer merely turned around and placed this order with his own engineers who knew nothing whatever about glass or its manufacture, "Develop a method for making our windshields in a continuous sheet." And forthwith the engineers worked at the problem, solved it, and their windshields are now being made in a continous sheet.

What Speed Do You Want?

ONE of the many former impossibilities that we have with us today is a power transmission device that will convert a given number of pulley revolutions into almost any desired number or r.p.m. It will vary the speed for you at will, while the machine is in operation. No stopping to change pulleys or throw belts. No time lost. You get *any* speed ratio you want. If you want 379¾ r.p.m. you can have it by a simple twist of the wrist. If you want to increase that a bit, say to 383.776 r.p.m.—very well—the device will give it to you and then will almost say, "Give me a difficult one."

No doubt thousands of us have at one time or another puzzled over the possibility of making a machine that would give a variable speed ratio via pulleys and belting. But

it appears that only one of us hit on the method of using two sets of double conical pulleys, each set having the cone apexes pointing at each other, and a V-Belt connecting the two sets. Then, to obtain any speed ratio, simply move the cones of one set away from each other, and simultaneously move the cones of the other set toward each other, and the "t" is knocked out of the old "Can't be done."

Of course a device of this type cannot be used everywhere economically. Where speeds are changed only occasionally, and where the old step cone pulleys will do the work satisfactorily, I wouldn't recommend this modern device. But where you want a fine adjustment, where you want to change speed without stopping your machines, where speeds must be changed often, and where a considerable range of speed variations is essential, I know of nothing that can approach this device. It is strong, compact, durable, and surprisingly efficient.

Tire and Tube Production Falls Off

ALTHOUGH still at a high level, the output of tires and inner tubes by manufacturers in the United States during July dropped somewhat from the figures of the previous month because of holiday cessations from work. According to the report of the Rubber Association of America, Inc., the total production of tires and tubes was far higher than in July, 1927. The decrease from June figures was caused by a falling off in the output of balloon casings and tubes, as the production for high pressure tires showed an increase.

The figures for July as released by the Rubber Association represent 75 per cent of the total industry in the United States and have been brought up to represent 100 per cent in the following table:

TIRE AND TUBE PRODUCTION

	June, 1928			July, 1928		
	Prod.	*Ship.*	*Inven.*	*Prod.*	*Ship.*	*Inven.*
			(*All Figures Represent Thousands*)			
PNEUMATIC CASINGS						
All types	6,692	7,117	12,162	6,498	7,895	11,157
Balloon	4,878	4,648	7,450	4,479	4,878	6,954
High Pressure Cord	1,794	2,417	4,483	2,008	2,942	4,052
High Pressure Fabric	20	51	128	11	75	151
SOLID AND CUSHION TIRES	64	64	205	61	64	201
INNER TUBES						
All types	6,953	7,136	17,159	6,674	8,729	14,974
Balloon	4,737	4,245	9,748	4,321	4,768	9,058
High Pressure	2,215	2,891	7,411	2,353	3,960	5,914

August Rim Output Shows Gain

ALTHOUGH falling slightly below the peak output of June, the production of automobile and other rims during August showed an appreciable gain over the figures for July and a high increase as compared with August, 1927. The number of rims inspected and approved by the Tire and Rim Association of America, Inc., during August totaled 2,318,898 as against 2,209,692 in July and 1,825,905 during August of last year. Gains in practically all classes were shown, and airplane rim production was marked by an increase of more than 118 per cent.

Rim Size	Aug. 1928 No.	%	8 Mos. 1928 No.	%
MOTORCYCLE				
24x3	2959	0.1	25521	0.2
26x3	4220	0.2	35616	0.2
28x3	——	—	753	0.0
Total	7179	0.3	61890	0.3
CLINCHER				
30x3½	96426	4.1	435360	2.5
31x4	——	—	3292	0.0
Total	96426	4.1	437752	2.5
18" BALLOON				
18x3½	——	—	9362	0.1
18x4	132681	5.7	933499	5.3
18x3.25	26517	1.1	79520	0.5
18x4½	17296	0.7	103227	0.6
18x5	684	0.0	4461	0.0
Total	177178	7.6	1130069	6.5
19" BALLOON				
19x2.75	54487	2.5	71920	0.4
19x3½	112274	4.8	1386668	7.9
19x4	340878	14.7	1795266	10.3
19x3.25	3045	0.1	8664	0.0
19x4½	91563	4.0	719103	4.1
19x5	8886	0.4	30157	0.2
Total	611133	26.4	4011778	22.9
20" BALLOON				
20x2.75	44241	1.9	149268	0.9
20x3½	17704	0.8	372739	2.1
20x4	341587	14.8	2594815	14.8
20x4½	81088	3.5	365427	2.1
20x5	64569	2.8	562737	3.2
20x6	6954	0.3	79174	0.5
Total	556143	24.0	4124160	23.6
21" BALLOON				
21x2.75	423840	18.3	4245146	24.2
21x3½	52832	2.3	602691	3.4
21x4	28847	1.2	460222	2.6
21x4½	6433	0.3	260465	1.5
21x5	——	—	7240	0.0
21x6	——	—	4233	0.0
Total	511952	22.1	5579997	31.9
22" BALLOON				
22x3½	——	—	1775	0.0
22x4	1035	0.0	3197	0.0
22x4½	990	0.0	2440	0.0
Total	2025	0.1	7412	0.0

Rim Size	Aug. 1928 No.	%	8 Mos. 1928 No.	%
HIGH PRESSURE				
30x3½-23	12658	0.5	47536	0.3
31x4 -23	——	—	640	0.0
32x4½-23	9329	0.4	59558	0.3
32x4 -24	6932	0.3	58577	0.3
33x4½-24	1910	0.1	2316	0.0
32x3½-25	50	0.0	50	0.0
33x4 -25	——	—	2198	0.0
34x4½-25	817	0.0	5949	0.0
Total	31696	1.4	176824	1.0
20" TRUCK				
30x5	239334	10.3	1374170	7.8
32x6	49726	2.1	314804	1.8
34x7	16255	0.7	90239	0.5
36x8	7809	0.3	51768	0.3
40x10	314	0.0	4241	0.0
Total	313438	13.5	1835222	10.5
22" TRUCK				
36x7	——	—	8987	0.0
38x8	——	—	200	0.0
Total	——	—	9187	0.1
24" TRUCK				
34x5	——	—	14487	0.1
36x6	2192	0.1	33658	0.2
38x7	4279	0.2	41278	0.2
40x8	2211	0.1	23838	0.1
44x10	——	—	796	0.0
Total	8682	0.4	114057	0.7
AIRPLANE				
8x3 SS	21	0.0	42	0.0
12x3 SS	52	0.0	73	0.0
18x3 SS	366	0.0	458	0.0
20x3 SS	——	—	6	0.0
20x3½ SS	143	0.0	1552	0.0
20x4 SS	162	0.0	748	0.0
21x4 SS	——	—	21	0.0
20x5 SS	8	0.0	76	0.0
20x6 SS	——	—	2291	0.0
24x10 SS	——	—	53	0.0
18x4 Cl	2294	0.1	8961	0.1
Total	3046	0.1	14281	0.1
GRAND TOTAL	2,318,898		17,502,629	

Rubber Footwear Lasts Become Heavy Expense Problem

Continual Seasonal Changes in Lasts, Remodelling and Replacing Puts Heavy Cost Burden on Rubber Footwear Manufacturer—Trend is Toward Concentrating Production in Three or Four Styles

ONE of the things that has been a heartbreaker to the small tire manufacturer in the past has been the constant succession of new sizes and types of tires which has meant continual equipment outlay for which he could see no adequate return. In rubber footwear, while there are no molds to buy, there is a continual expense of buying new lasts, remodelling, and replacing. It is so much a part of the business that practically all concerns charge it off currently to operating expense.

In designing lasts for rubber shoes, the manufacturer's first object is to arrive at a model which will cover as wide a range of popular leather shoes as possible. He must also determine what models of leather shoes are destined to be *worn* in the greatest proportion during the coming season. Note the emphasis on the word "worn." In reality, it is very important, more so than data on the latest leather shoe models as these must first go through a cycle of leather shoe production, then to the retailer, then to the consumer, before the demand for a rubber or overshoe to fit it is felt, and if the style is not a big success, the demand may never be felt at all. On the other hand, a style two or three years old may still be popular.

Checking Style Trends

The designer of the last is primarily concerned with the women's shoes, as they are the hardest to fit and have the greatest variety. While there is some variety in men's shapes, they are more staple, along with boys', misses' and children's. Then again, in recent years, the fit-all type of rubber last with rounded flexible edges has eliminated much of the variety of lasts except on women's, where it has not proved a success. Most of the rubber footwear companies have a contact man on lasts who profitably spends much of his time out among the trade watching the style trend and checking up on the fit of his own lasts. Salesmen from the various territories are also good sources of information on last trends.

If a designer for a new company just starting out were to get out a line of women's lasts, the first step would be grouping of the styles according to points of similarity. Then the groups are simmered down to individual shoes which possess the most points in common. The shoe of each group which comes nearest to the specifications of all of them is sent to the last maker, who reproduces a model in wood, made exactly to fit over that shoe. This is a starting point. The pattern department makes a rubber gaiter or gum shoe over this last which is tried on a girl who wears in turn each of the shoes for which the model is designed to cover. Corrections are made much as the tailor chalks up a suit for alterations. The instep is made fuller, the ankle is cut in, the toe is more rounded, the heel seat made smaller, and so on. From a constant repetition of this process, the final model is worked out.

Rubber shoe lasts are made of both wood and metal. The wooden lasts which are turned out from kiln-dried hard maple blocks are most popular for styles which may be only temporary, although some of the latest type which have metal bottoms and metal pin inserts are finding favor as equipment for more enduring styles. Metal lasts are almost entirely made from aluminum. The advantages of this metal are its light weight, heat conductivity (thus aiding the vulcanization process), and durability. The process of their manufacture, however, is most intricate, first wooden models have to be made and minute attention must be paid to shrinkage, as the lasts are casts with a hollow center necessitating the use of a core box. As a model must be made for each size and half size, they prove to be very expensive, on small runs especially. For this reason they are used only for staple and permanent styles such as boots, pacs, lumbermen's, misses' and child's and men's staple lasts.

Two-piece Pressed Steel Lasts

Several companies have been trying to interest the rubber footwear trade in two-piece lasts of pressed steel, which it is claimed will have many of the advantages of the metal last without the extra expense. But the difficulty with this proposition is that a heavy expense is required to make the dies, and unless progress could be made so that every manufacturer would use the same lasts, the expense would be prohibitive.

This brings attention to a strange condition of non-standardization. Every footwear company works out the problem of fitting up to cover leather shoe lasts entirely independently of the other with the result that each one has a model to fit certain shoes, which, while to all practical purposes is the same, actually is of different dimensions in some particular.

Briefly, the advantage of metal lasts over wood is that they heat up more quickly, insure more uniform cure inside and outside of the shoe and are more durable. On men's boots, the wooden tree has entirely disappeared and the aluminum trees are made in two parts with a connecting rod which releases the toe from the leg of the last. This is to enable it to be stripped readily.

Pattern Room Work Important

After the last is designed, it passes to the pattern room to be fitted up. This work requires an eye for artistic details and practical knowledge of rubber shoe construction. Everything is built for the model size, after which it is an easy matter to grade out the other parts on a combination sole and upper grading machine. The fabrics to be used in the shoe must be tried out after they are coated or frictioned to determine the percentage of stretch so that due allowance should be made for this in the patterns. After the different parts are graded out into sets of cardboard patterns, the usual practice is to copy them in tin patterns for hand cutting at first, to give the shoe a short production run owing to the possibility of slight changes being necessary.

When finally approved, the next and final step is to send them to the die-maker for cutting dies, as no shoe can be produced economically by hand cutting. Cutting dies are of various types. For the heavy parts such as heel pieces, rag

soles, etc., so called 5-inch Walker dies are used. These permit of volume production on beam cutting machines. Lighter friction and cloth parts may be made up in 2¼-inch band dies for machine or in 1¼-inch clicking dies for clicker cutting machines. Gum upper parts are usually cut out by mallet handle die, and outsoles require beveled edge cutting patterns for the Wellman or Patten sole cutter. Practically all dies today are made from steel and are electrically welded at the joints in contrast to the old hand forged iron and steel die.

Thus it can be readily visualized that fitting up to make one style of shoe involves considerable outlay in lasts, patterns, and dies before a batch of compound can be thrown on the mill. Practically all runs are made in two widths, narrow and wide, which means duplication of this equipment all through. This is one costly item of expense in rubber footwear upon which little reduction has been made in the last few years. Novelty gaiters have rather had a tendency to increase the outlay as more accurate fitting shoes are required than ever before.

This multiplicity of lasts, dies and patterns in rubber footwear manufacture has a far more reaching effect on costs than the original outlay. Every different last, size, and pattern, means somewhere along the production line a change from one outsole or upper role to another, from one die to another, last to last, and so on, and time spent in changing is not in a strict sense economical production time. That is why the continuous stream production idea in footwear often runs against a snag. A keen and active rubber footwear executive once remarked that if Henry Ford were in the rubber footwear business he would make everyone wear size eight. It is a serious problem. Several of the new companies in the game have made rapid progress because they have realized it, and concentrated their production on three or four popular styles out of the four hundred, using one width of a fit-all type last to attain steady runs and mass production.

Gasoline Becoming More Volatile

THE motor gasoline marketed in the United States this summer is slightly more volatile than that sold a year ago, according to the United States Bureau of Mines, Department of Commerce, which recently completed its 18th semi-annual motor gasoline survey. The increase in volatility is shown by a lowering of the distillation temperatures, ranging from 2°F. at the average initial boiling point to 4° F. at the average end point.

In the past there has usually been a distinct difference between "summer" and "winter" gasoline, that marketed during the summer being less volatile than that sold during the winter.

Although the gasoline marketed this summer is more volatile than that sold during the summer of 1927, it is less volatile than that marketed in January, 1928. There is a decided tendency toward better fractionation in the manufacture of gasoline.

During the past nine years the Bureau of Mines has made semi-annual surveys of the gasoline marketed in the United States. The cities in which samples were collected have been chosen as representative of the more important marketing territories, as it is obviously impracticable to obtain a sample of every gasoline sold in the entire country.

Fixed Charges High

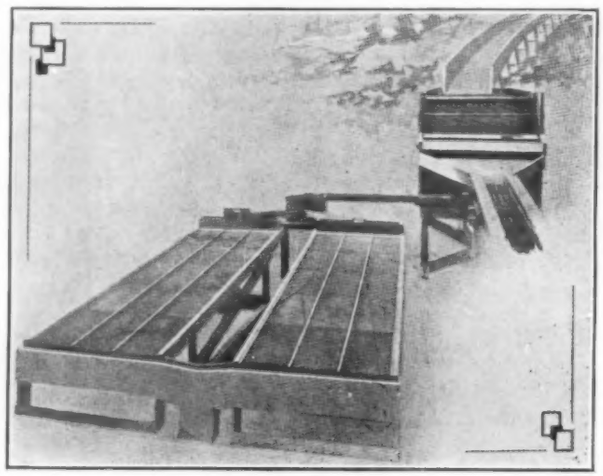
THE Standard Statistics Company, New York City, has prepared a study of how various groups of American industrial companies have been apportioning their net profits in recent years. In their table it is shown that a group of 9 companies manufacturing automobile tires paid out 28 per cent of their net profits in 1927 for fixed charges, and 54 per cent for fixed charges and preferred dividends.

These percentages are much higher than the average and in commenting on them the Standard Statistics Company says: "At least four industries near the top of the table—automobile tires, meat packing, sugar and shipping and shipbuilding—'paid through the nose' for their funded debt, as the Wall Street phrase has it. They were gravely affected by the 1920-21 business depression, and the only way they could procure the necessary capital for their escape was by placing heavy mortgages (bonded indebtedness) upon their properties."

Sponge Rubber in Mining

A NEW use for rubber in connection with mining has been devised by a California inventor who finds sponge rubber mats very efficient in the recovery of small particles of gold and platinum which usually escape in the washing processes. It is said that with the sponge rubber mats over 90 per cent values of the ore are extracted.

The thousands of tiny cells in sponge rubber create an agitation or riffle as the pulp or sand passes over the mat



Application of Sponge Rubber Mats in Mining

and the surface cells catch and hold the fine particles of precious ore. Lighter particles flow over as waste. Since the equipment is so simple, it is adaptable for both large and small mines.

In the early days of California it was the custom of the old-time miners to wash or "rock" for nuggets with little or no thought of saving the fine gold. The rubber mat will actually recover practically all the fine gold.

The rubber mats are adaptable to many types of mining equipment. Cleaning the mats of the accumulated ore concentrates is a simple process, involving only washing with water from a spray nozzle under medium pressure. Where the spray is not available, the mats may be immersed and beaten in any large vessel to free the accumulated ore. In one type of installation the mats are arranged on a belt which passes through a clean-up box into which the concentrates are automatically dumped from the cells of the mats.

A series of sixteen lectures on the subject of "Rubber" will be given at the City of London College this fall. Ten of the lectures will be by George Rae, the well-known rubber expert of the firm of Harrisons & Crosfield. An examination will be held at the end of the course and a prize is offered by the Rubber Growers' Association and the Rubber Trade Association to be awarded to the best student.

RUBBER CHEMISTRY
and Technology

Researches on the Structure of Rubber*

By PAUL BARY AND ERNST A. HAUSER

IN recent years studies of the properties of raw and vulcanized rubber have chiefly followed three lines of investigation, leading to a clearer conception of the structure of rubber.

(1) The existence of two components in rubber.

(2) The transformation of one of these components into the other.

(3) The structure indicated by diagrams obtained with x-rays.

At first it appears difficult to correlate the various observations, but after giving a resumé of the principal points, we shall propose a concept of the structure of rubber which explains its general properties and reconciles the older and the newer results.

In 1867 Govi[1] tried to explain the phenomenon today known as "the Joule effect," viz., that rubber becomes warm when elongated and cool when retracted, and if subjected to an elongating force, it contracts on heating. Govi considered rubber analogous to a solid foam, in which the spaces are filled by a gas. This theory was criticized by Thomas[2] in 1869 and later by Hesehus[3]. They determined the specific gravity of rubber and then dissolved it to permit any occluded gas to escape. After evaporating the solvent, they determined the specific gravity of the solid residue, and found the value identical to that which they obtained at first. In 1886 Malock[4] suggested the hypothesis that rubber is a mixture of an easily deformed substance and a rigid substance. A similar hypothesis, though more systematically developed, was suggested by Fessenden[5], who, basing his opinion on observations made with other substances, thought that rubber consisted of two substances, inelastic in themselves, which, however, being soluble in each other, could give under certain circumstances a mixture having elastic properties. According to Fessenden, rubber can be considered as formed of a mixture of a mass having little extensibility and a mass which is plastic. To render this hypothesis more intelligible, Fessenden made an interesting series of experiments, using hollow metal balls filled with water[6].

At the beginning of this century, new theories were advanced with progress in physical chemistry, depicting in a more profound way the internal structure of rubber. The work of Breuil[7] should be mentioned, his opinion being that rubber is formed of certain molecules imprisoned in a plastic medium, and that of Chaveau[8], who attributed the unusual properties of rubber to changes produced in the molecular arrangement, and to modifications which the intermolecular spaces undergo. Similar theories were advanced by Schwartz and Kemp[9], and by Chéveneau and Heim[10], who considered rubber as formed of hard, inelastic kernels surrounded by a deformable, very elastic substance. Weber[11], and afterwards Caspari[12], were without doubt the first to try to prove experimentally that rubber consists of two hydrocarbons entirely different in physical properties. Though this assumption has been frequently criticised, Duclaux[13], Feuchter[14], and later Pummerer[15] succeeded in fractionating rubber into two hydrocarbons of different physical properties. Paticularly in the last few years when interest has been awakened in the source of rubber, that is, latex, a large number of studies have been published on the structure of rubber. Those of Pickles[16], Lunn[17], Freundlich and Hauser[18], Van Rossem[19], Park[20], and Hauser[21] particularly should be mentioned. These publications are all based more or less on the character which rubber would possess if it contained two distinct phases, as have been shown by means of the micromanipulator really to exist in the particles of *Hevea Braziliensis* latex.

From the first it has been considered necessary to explain the physical properties of whole rubber by the existence of two components which differ only in their physical properties and which have the same empirical formula $(C_5H_8)n$. The truth of this assumption has been proved by the numerous authors whose works have just been mentioned. In this paper these two forms of rubber will be called *a*-rubber and *β*-rubber, the former indicating the more soluble rubber of Feuchter[22] and the latter the less soluble.

The Change of *a*-Rubber to *β*-Rubber and Vice Versa

The chemical generalization that the fusibility, solubility, and volatility of polymers decrease with increase in the degree of polymerization immediately suggests the thought that the two forms of rubber differ only in their degree of polymerization, *a*-rubber having smaller molecules than *β*-rubber.

The fact that rubber softens with increase in temperature, passing from a solid to an almost liquid state but only in progressive stages and over a considerable range of temperature, suggests a transformation by heat of *β*-rubber into *a*-rubber, the increased mobility being due to a reduction in size of the molecules. On cooling, the opposite phenomenon takes place slowly, but the plasticity of the rubber does not follow the variations in temperature closely, for the greater the viscosity, the slower is the rate of repolymerization.

The theory of varying degrees of polymerization in rubber is based on a long series of observations of the most varied nature, and permits the explanation and prediction of what will happen in the most diverse cases. Thus it would be expected that milling rubber in the cold greatly reduces its average degree of polymerization, since its solubility increases with this treatment; the same reduction obtained by heat produces the same effects. The proof that dissolution of rubber is accompanied by a diminution in the average degree of polymerization of the molecules is shown by the fact that rubber that is milled or heated for a long time and thus rendered plastic, dissolves more readily and completely than similar rubber not subjected to such treatment.

The viscosity of solutions of rubber which has been milled or heated is in general much less than that of solutions of the same rubber not so treated. A recent work of Fry and Porritt[23] shows the importance attached to this property in following the variation in the degree of depolymerization of rubber under various influences.

The action of heat and of mixing on the solutions themselves changes the viscosity to a greater or less degree, as shown by Caspari[24], Axelrod[25], Fol[26], and Klein and Stammberger[27].

Heat and mechanical treatment, which change the solubility of rubber and give its solutions different properties, can only be interpreted by assuming a reduction in the degree of polymerization, with increase in solvation, which is considered in itself as a chemical reaction.

Other weak chemical reactions, such as oxidation or vulcanization, are accelerated in the same way as the solubility, and by the same means (heating, mixing, or previous solution).

Resins dissolved in natural raw rubber and combined with it in the form of solvates give to the product properties similar to those of solutions made from rubber which has been heated or milled. In particular the viscosities of such solutions are very low compared with those of rubber from which the resins have been previously extracted, as shown by Fol[28] and Stevens[29].

All these facts are well known, as they have been studied as much from a practical point of view as by scientific experiments, and there is no need to dwell on them longer.

On the other hand it is known that rubber which has been mixed or which has been recovered from solution by coagulation or

*Translated from Revue Générale du Caoutchouc June, 1928, pp. 3-11, by J. P. Fahy.

evaporation, when left for a sufficiently long time in darkness at a slightly elevated temperature, regains its initial properties and "nerve," and can even harden completely. In this case there is an increase in the degree of polymerization, or a more or less complete return to the original condition.

The sum total of these results has already led one of us[30] to express the opinion that the hydrocarbons, α and β, of which rubber is composed are associated after the manner of the two components of a jelly.

The experiments of Bary and Fleurent[31] have shown that rubber whose state of polymerization has been disturbed by mechanical working or heat can be modified either by increasing the quantity of α-rubber and decreasing the β-rubber, or *vice versa*.

From these facts it follows that the α- and β-forms of rubber are essentially transformable one into the other, but in any case the ratio α/β tends toward an equilibrium which is more or less rapidly attained[32].

The Number of Phases in the System "Rubber"

The fact that two analogous but different components exist in rubber can be considered as absolutely established, but the manner in which they are united is not so clear.

If, as we think, rubber can be considered as a jelly, that is, if the system can be regarded as the solution of two or more polymers of rubber in each other, then it is similar to a solution of crystalloids in water or in a mixture of other liquids, and the system, no matter how many components it contains, will comprise but a single phase[33]. Such a system is optically empty, that is, absolutely transparent.

The purer a rubber is the more closely does it fulfil this last condition, but it is never perfectly transparent, for in no case can it be considered as perfectly pure. Nevertheless, it may be assumed that, if complete purification were possible, an optically empty system would be obtained.

Granting this conception, rubber is representative of the class of substances defined by Wo. Ostwald as *isocolloids*, that is intimate mixtures of the same substance in different degrees of aggregation. However, rubber is considered by Ostwald[34] as formed by the dispersion of β-rubber in a continuous medium of α-rubber while in the hypothesis of solid solution and the existence of a single phase, the mixture of the α- and β-forms has the structure of a solid (β-rubber), swollen by a liquid (α-rubber) in the same way that gelatin can be swollen in water.

The difference between these views is based upon the mechanical properties which one can expect of the two systems.

If a fine powder is mixed into a liquid or pasty substance such as α-rubber, the fluidity of the liquid or paste is diminished, and a more or less plastic mass is obtained, but the liquid or paste is never transformed into an elastic solid. To obtain the latter, the solid part of the mixture must possess a strong intermolecular cohesion, which is conceivable only if the molecules are in a dispersed state, either alone or in aggregates.

The same characteristics are observed when a jelly (obtained by swelling a hydrophilic substance) is compared with a gel, such as that produced in the formation of a colloidal substance by the separation of the liquid medium. The first case corresponds to a state of affinity of the colloidal substance for the liquid which it absorbs, while the second is, on the contrary, a syneresis and expulsion of liquid previously held in union.

A *jelly* is a one-phase system, and we have shown[35] that swelling is accompanied by the chemical phenomena of depolymerization and solvation. A *gel* on the other hand contains two or more phases, whatever may be the state of dispersion of any one in the others.

X-Ray Diffraction Spectra

In 1925 Katz and Bing[36] observed that when examined by x-rays rubber under tension gives a diagram which is identical with the diagrams of different kinds of fibrous substances. When not under tension, rubber gives only one or two faint amorphous rings[37]. This observation has lately been very useful in researches on the structure of rubber. From the first it was agreed that this mode of experimentation was the only practical means of approaching the study of the structure, and such success has been obtained that we may hope for future progress in fields of research which are unknown at present.

A large part of our knowledge can be credited to researches with x-rays, and special attention should be given the work pursued in this direction. Katz[38] has also observed in a later work that the interference spots become visible only when the rubber is elongated 80 to 100%, and he was able to prove that they disappear when the tension is released or when the rubber is heated. We also owe to him the first observation that vulcanized rubber gives a similar diagram when it is stretched, with the sole difference that the intensity of the interference spots is a great deal weaker than in the case of raw rubber.

Hauser and Mark[39] have studied these phenomena systematically and have made the first important contribution in this field of research, a field which has since been greatly developed. They confirmed the observation that the interferences appear only at a minimum elongation of 80 to 100%, and they also proved quantitatively that these interferences do not change from the moment of their appearance up to a maximum elongation of about 1000%, but that their intensity does increase proportionally to the degree of elongation. These researches were made by comparative measurements with a precise photometric standard. Moreover it has been established that the position of the amorphous band does not vary, but that its intensity decreases almost in proportion to the increase in elongation. The experiments were also carried out on rubber under tension in two directions, in all directions in a single plane, and also on rubber under compression, the resulting changes in the diagrams being examined. In all cases the results absolutely agreed with those which would be expected of a purely crystalline structure. In every case of a rubber under tension it has been possible to establish an anisotropic structure identical to the fibrous ring diagrams of Weissenberg, rubber under torsion giving a fibrous diagram of the spiral type.

The same authors have tried to explain the appearance of the interference spots, as is done for other substances by the theory of normal crystals. They succeeded completely by assuming an orthorhombic, rectangular crystalline system with the long axes parallel to the direction of stretch ($a = 7.68$ A.U.)[40], while the other two axes are 8.0 and 8.6 A.U. respectively. Under these conditions the molecule of the elementary substance should be represented by $(C_5H_8)_4$, though in the case of highly stretched samples a double formula should be assumed, *i.e.*, $(C_5H_8)_8$. To produce these interference spots it is necessary to employ samples which are greatly elongated.

In explaining the results, Katz on the one hand, and Hauser and Mark on the other, differ in opinion in that Katz supposes a regular formation of crystals during elongation, while Hauser and Mark, basing their opinion on similar researches with organic compounds, think that the "crystallization" which causes the interferences to appear during the elongation already exists in the non-elongated substance in the form of aggregates of molecules. Granting this hypothesis, which is the basis of the well-known theory of these authors, one is led to consider the crystallites as swollen by a non-crystallized portion when the rubber is at rest. The deswelling produced on stretching the sample is then the cause of the interference spots. From the mean value of the maximum intensity of the interference spots, Hauser and Mark have been led to conclude that the dimension of the particles need not change during the elongation and that the increase in intensity is due to the continuous appearance of new crystallites of equal dimensions.

Katz and several other investigators had already observed that rubber may give a Debye-Scherrer diagram without being under tension, with unaltered interference spots. The appearance of a Debye-Scherrer diagram, in which the simple bands correspond to the position which the interferences normally occupy under exactly similar experimental conditions, leads to the conclusion that the crystallites must already be present in the material before elongation but that they are not oriented. This observation quite agrees with the preexistence idea accepted by Hauser and Mark. From the point of view of rubber technology, its interpretation is rendered rather difficult by lack of sufficient data on the samples employed. It was only after a complete study that it was possible to show that raw rubber, which has become hard and inelastic after long storage (in the state called "frozen rubber" by the rubber industry), shows the same Debye-Scherrer bands, which seem to explain this phenomenon also.[41]. By analogy with numerous determinations made with natural colloids, it may be assumed that on storing certain changes occur which are known as "aging" and which are due generally to a contraction of the skeleton structure. The arrangement of the interference spots in the case of rubber which has not been stretched seems to be due to the fact that during its manufacture the rubber has undergone elongation effects which harden it for a rather long time. If such a hardened rubber is rapidly stretched or heated several times, it regains its elasticity and simultaneously loses its property of giving interferences without being previously stretched. Here again is a completely isotropic substance. This effect is most extreme in the case of rubber subjected to repeated adiabatic elongation, which is called "racked" rubber[42]. It is possible under these conditions to obtain samples racked from smoked sheets with an elongation of 10,000% and more. This rubber has not only a sheen or silky appearance but shows very marked differences from normal rubber. Racked rubber is practically inelastic and resists tension like natural fibres. Examination with x-rays has also shown characteristic differences from normal rubber. If the rubber has been racked to the maximum, it shows a certain number of entirely new interference spots, which can probably be interpreted by introducing into the calculation a multiple of the factor 4 given above. Moreover the amorphous band entirely disappears. Probably then

under these conditions the orientation of the rubber is complete, or in other words maximum deswelling is reached.

Experiments made with other organic substances which thus far have failed to give interferences with x-rays should also be mentioned. Metastyrol deserves special attention in that it shows an amorphous band very similar to that of rubber. If this substance is racked, Hünemorder[43] has shown that at an elongation of about 1000% distinct signs of interferences in the equatorial line become evident. It may be assumed therefore that, were this substance strongly racked, a complete fibrous diagram would be obtained. The only reason that this experiment has not been carried out is that certain experimental difficulties have thus far not been solved.

Interpreting the Diagrams

A point regarding the structure of rubber which is not sufficiently explained is that mentioned above; *viz.*, that interferences appear only at elongations of 80 to 100%. However, recent researches on the effect of the speed of elongation on the resistance to extension seem to throw new light on this question. It has been shown that the stress-strain curves of raw rubber depend not only on the speed of elongation but also on the temperature at which the experiments are carried out. It has been possible by employing very slow speeds and high temperatures to obtain elongation effects showing differences from those obtained under normal conditions. In the case of these researches, which have been discussed in detail by Hauser, Rosbaud[44] and Schmid[45] it has been possible to show a flow similar to that already known to take place in the case of metals.

In view of these established facts, it has seemed equally interesting to study with the aid of x-rays very slow elongations, and thus it has been shown that, although raw rubber gives a distinct diagram at 500% elongation, it shows only an amorphous band at the same elongation if the tension is applied slowly[46]. In other words the rubber remains isotropic, as can be seen under the microscope, and the sample remains clear. All the results obtained lead to the conclusion that this effect is a result of a flow or displacement of the substance and that the speed of deswelling is exceeded by the speed of flow. However, it seems justifiable to put a more precise limitation on the minimum elongation necessary to obtain the interference spots, *viz.*, 80 to 100%. However, it is not impossible to obtain the same effects with less elongation if the correct choice of speed and temperature are employed. It should not be forgotten that the time necessary to obtain the x-ray diagrams is rather long, and it must be admitted that at low elongations the flow effect is the greater, and consequently the interferences cannot be visible. Hauser and Mark, after having accustomed their eyes to the dark, have been able to show many times by employing a fluorescent screen that the appearance of the interferences is a spontaneous effect, and that consequently it seems possible that the interferences can be likewise observed at very low elongations if the proper speed and temperature are chosen.

In recent literature, it is frequently noticed that the results of researches with x-rays and those obtained by microscopical examination of latex have been confused and inexact suppositions have been made by comparing the special structure of the latex particle with the results obtained with x-rays. If the difference in size of the objects studied in the two cases is considered, it is clear that this confusion would not occur. Rubber that has been milled until the latex particles are completely destroyed regains its elasticity on vulcanization, and on elongation gives an x-ray diagram. The same rubber, if well broken down and then let stand for a long time, shows the typical Debye-Scherrer band already mentioned. Moreover, by proceeding with the greatest care, by dissolving in ether, so-called "total rubber" or chemically pure rubber can be separated, and though the latter may be formed of several fractions giving exactly the same diagram, the hypothesis seems correct, since the least soluble fraction gives the greatest effects, and that substance ought to predominate when the interferences are observed.

X-ray diagrams obtained in the study of raw rubber when it is not elongated, when it is elongated, or when it is in the form called "frozen," have shown as already said, either amorphous bands in the first case, or well defined interference spots giving the appearance of a fiber diagram in the second case, or finally Debye-Scherrer-Hull rings in the third case. It appears interesting to discuss briefly the information that can be obtained from these three distinct effects obtained with monochromatic x-rays. In all cases a beam of monochromatic x-rays was employed, and the pictures were taken by placing a photographic plate or film at a right angle to the incident beam behind the material under examination. Accordingly this method can be compared with that employed by Laue in the examination of crystallographic lattices.

According to the theory of Bravais, the atoms or molecules in a given crystal are systematically arranged in a definite lattice, and thus maximum interferences result. In an amorphous substance as for example a liquid, the atoms or molecules have no regular arrangement in the lattice any more than they can be considered as placed in parallel equidistant planes scattered about by chance. Consequently the diffraction obtained with these substances produces a general blackening of the plate, or, as usually happens, a large diffuse band in the immediate vicinity of the primary incident beam. This diffuse band, observed in non-elongated rubber and also in liquids, glasses, jellies, etc., is easy to distinguish from the picture given by a crystal, and even from the interferences given by colloidal crystalline particles. In some cases, however, particularly with rubber that has been "frozen" by long storage until it has become hard and opaque, x-rays give concentric continuous rings (Debye-Scherrer-Hull) if the rubber has not been elongated. These rings are likewise obtained in the study of powdered crystals. The appearance of these rings indicates, in the case of rubber, an accidental formation of a reticular structure, or a diffraction produced by atoms regularly spaced in molecules distributed by chance, that is, the formation of molecular aggregates or of fragments of crystals, with no definite orientation.

Doubtless the most important effect is that obtained by elongation. If a sample of "frozen" rubber is elongated, there is obtained, besides the amorphous ring or the Debye-Scherrer-Hull rings, definite interference spots which become clearer the greater the elongation. At the same time the amorphous band or the Debye-Scherrer-Hull rings decrease in intensity and lose more or less of their continuity. The interference spots, however, as already said, keep their position. A pure, fibre diagram with spots which are located on branches of hyperbolas is then obtained. This leads to the conclusion that a material is involved which produces a diffraction like crystals arranged parallel to the direction of the force applied. The accuracy of this statement is based on the fact that the spots are located on hyperbolas as in the case of perfect fibres. All evidence seems to show that true crystals do not exist in rubber before elongation, but that it contains molecular aggregates of definite dimensions (micelles), which do not give interference spots for a reason similar to that which produces this result in the case of crystals which have been heated to a high temperature. The primary particles have an amplitude of oscillation too great for any distinct interference to be obtained. During the elongation, the interior orientation becomes more regular and interference points appear. As the position remains constant and as only the intensity increases, and as the size of the line of diffraction does not change, it must be assumed that the crystalline units do not increase, but that new units appear.

Interpretation of the Results in General

From the results obtained by different experimental methods the following conclusions are warranted regarding the nature of rubber, which may contribute to an explanation of its properties.

1. There exist two components or two types of components with the same elementary chemical constitution, but of differing degrees of polymerization and very different degrees of fluidity. The type of component with the greater degree of fluidity naturally corresponds to hydrocarbons having the lower state of polymerization.

2. The relative quantities of the two components of rubber very in such a way that calling α and β the average values for the degree of polymerization of each of the components, and n_1 and n_2 the number of corresponding molecules, the ratio $\frac{n_1\alpha}{n_2\beta}$ varies particularly with the temperature and various mechanical treatments.

3. At ordinary temperature or at somewhat lower temperatures, rubber at rest tends toward a very low value for the ratio $\frac{n_1\alpha}{n_2\beta}$ which is increased by work or heat or by repeated elongations.

4. The fact that unstretched "frozen" rubber which has been stored at a low temperature gives the Debye-Scherrer-Hull rings when the quantity of β-rubber has increased at the expense of the quantity of α-rubber shows that it is the less diffusible form of rubber which gives the Debye-Scherrer-Hull diagram.

5. In the elongation of normal rubber (not frozen) the α-component, which was dissolved in the β-component to form a jelly, separates as a result of the negative internal pressure caused by the extension, and the jelly changes to a gel, that is, to a two-phase system.

6. In the elongation of "frozen" rubber there is a return to the normal form of "non-frozen" rubber, as there is on heating.

These results, based on experiment, indicate the presence in rubber of a sort of network of solid β-form which becomes on elongation a bundle of parallel filaments. Moreover, the reality of these filaments is confirmed by the "crystallization" experiments of Pummerer and Koch[47] and of Feuchter [48] and by the freezing of stretched rubber by Hock[49] and by microscopic observations on solutions of rubber during evaporation by Bary[50].

Conclusions

The theory according to which rubber consists of two components which normally are dissolved one in the other (Bary), is based on a number of physico-chemical observations, and is in general agreement with the results of x-ray work.

The very nature of the x-ray diagrams substantiates the theory

by introducing the idea that stretching rubber causes a separation of part of the dissolved component from its solvent (theory of Hauser and Mark).

It may be concluded that rubber consists of a network of β-rubber which is capable of giving x-ray diagrams only when it is sufficiently condensed, that is, when its chains of carbon atoms have little freedom of oscillation. This result can be obtained either by freezing the rubber, which increases the proportion of the β-form, or by elongation, which expels the α-portion and concentrates the β-portion.

This concept appears to explain all observations on the physical and mechanical properties of rubber.

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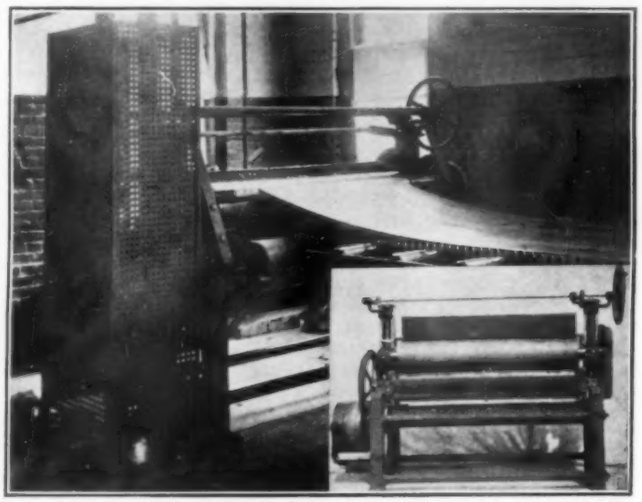
New Cement Spreader

THERE are many instances in the rubber industry where machinery from other industries has been adapted to advantage. A recent type of machine which has been used for some years in applying animal and vegetable glues to various surfaces, is now finding employment in several branches of rubber manufacturing.

This is the rotary cement spreader made by the Charles E. Francis Company, Rushville, Indiana. In contrast to the knife type of spreader, common to the rubber industry, this machine applies the cement which may be of very thin consistency, from a roll which revolves in a trough of the solution. The cement may be applied to two sides of the fabric or rubber sheet at one operation. As the material passes from the machine it is run over a drying unit with air circulating devices which evaporate the solvent and render the material ready for further processing.

Among the one side applications for which this machine is used is in the footwear industry on soling stock, which is usually cemented by the cut piece in the making department. By cementing the stock before cutting, a smooth,



Spreader in Operation. Insert: Front View of Machine

even coat is applied and the making process is speeded up. It has also been used on ducks and drills which take a light coat before being backed or doubled together for unlined shoes.

Another application of interest is on rag filler stock used in rubber footwear. This is cemented two sides on the machine and run into Linerette paper which keeps the plies from sticking together while cutting. This eliminates the use of talc which is not conducive to good adhesion, so important in good rubber shoe making. This shows tremendous savings over the old method of cementing the cut pieces by the hand brush method, although machinery is now available to cement the individual pieces mechanically. A possible advantage of cementing the stock first is saving in rehandling after cutting, but there is a possible disadvantage in that the scrap cuttings may contain a proportion of rubber cement coating.

10 YEARS AGO

Items Reprinted from September 25, 1918, issue of THE RUBBER AGE

THE rubber industry has received preferred classification as an "essential industry" by the government . . . The Rubber Section of the American Chemical Society held its annual meeting at the Hotel Statler, Cleveland, Ohio, with George Oenslager of the B. F. Goodrich Company presiding . . . Waterproofing companies have formed an advisory body to be known as the Waterproofers' Committee of the Naval Consulting Board . . . The plant of A. W. Faber, manufacturer of rubber stationery supplies, was sold by the Alien Property Custodian for $145,000 . . . Hood Rubber Company is to build a $135,000 addition to its plant . . . Theodore Krumeich is elected president of the Phoenix Rubber Company . . . The first letter to reach Akron by air mail was received by F. A. Seiberling, president of the Goodyear Tire & Rubber Company . . . Rubber Mutual Liability Insurance Company has been organized in Boston to take over workmen's compensation insurance work of rubber factories . . . Aviator Lieutenant Don Harris, formerly of the Goodyear Tire & Rubber Company, is interned in Holland for the duration of the war after having been forced to land there . . . Gregory Rubber Company, manufacturers of toy balloons and novelties, is to move from Akron to Warren Ohio.

Arbitration in Rubber Trading

(Continued from page 678)

the buyers so requested. The claimant company further argued that the rubber should arrive at the factory where it would be used, ready for processing; with the markers still imbedded there might be damage to the various pieces of machinery which handled the rubber and the claimant company feared that it might in turn be held responsible for such damage.

The respondent company showed that it was willing to make full the contention that it was not customary to remove the markers from this particular type of rubber. The respondent company claimed that it had been selling this rubber for eight years. For six of these years it was not customary to remove the markers. Then during the last year the markers were removed, but the company discontinued this practice feeling it was an unnecessary expense. It was also said that since the company had discontinued removing the markers, it had received no objections from factories on purchases, other than the present claim. The respondent company further alleged that it had in the past sold this same type of rubber to the claimant company and had delivered it without removing the markers. This contention was disputed by the A. Company, claimant. Since the burlap would have to be stripped from the rubber to remove the markers, it was testified that it would cost one-half cent a pound to do this.

The respondent company showed that it was willing to make full allowance for the weight of the markers in billing the rubber, and in addition was willing to guarantee the claimant company against any claim for loss which might be made by people to whom the claimant company might sell the rubber, or the respondent company was willing to cancel the contract. The respondent company further showed that during the past six or seven years it had never had a lot of this rubber rejected because the markers were not removed.

The claimant company testified that it had never shipped rubber to its customers with markers still imbedded. It insisted that the seller should be made to bear the expense of removing these markers. The respondent company countered by pointing out that this case was at best peculiar since it would cost a great deal to remove the burlap from the caucho balls, take the markers out, and replace the burlap, whereas the removal of the markers when the raw rubber was on dock would be a much less expensive operation. The claimant company in answer pointed out that it was not the cause of having the rubber in burlap before the markers were removed.

Award of the Arbitrators

The arbitrators awarded as follows: The seller must remove the wooden markers at his expense. Cost of arbitration and stenographic expenses for the account of the seller, the respondent company.

The arbitrators also made the following supplementary statement.

The arbitrators wish to go on record as having stated that they arrived at the decision in this case after careful consideration of the evidence introduced at the hearing, and after giving due consideration to the trade custom in matters of this kind.

The arbitrators are of the opinion that the practice of shipping rubber of the nature involved in this instance, with wooden markers imbedded therein, should be discouraged.

Docket No. 854—Arbitration Committee
Rubber Trade Association of New York, Inc.

Nature of the Dispute

It is the contention of the A. Company that the B. Company purchased from it on July 11, 1925, 15 tons of Up River Caucho Balls on a firm bid and that the B. Company should be made to perform on this contract. The B. Company insists that its bid was withdrawn before it was accepted and that therefore there is no contract of sale.

Positions of the Parties at the Hearing

At the hearing, Mr. K. of the A. Company testified that on the morning of Saturday, July 11th, he sold 25 tons of Bolivian Caucho Balls at the option of the A. Company to Mr. L. of the B. Company at 51½; the transaction was handled through the R. Company, brokers. The R. Company, on behalf of the B. Company, then asked Mr. K. for more Caucho Balls at the same price and Mr. K. replied that he thought he could get some more. In a few minutes, Mr. K. of the A. Company received a telephone call giving him a firm bid from the B. Company for 15 tons more of Caucho Balls at 51½. Mr. K. testified that he answered "I can work on that for a while," and received a reply, "Yes, you can work on that for a little while." Mr. K. in the meantime had heard that the S. Company was offering the same rubber at 50¾ and purchased from this company at this price, through the T. Company, brokers. As soon as Mr. K. received a telephonic communication from the T. Company to the effect that the contract of purchase with the S. Company had been completed, he instructed his telephone operator to get the R. Company, brokers, on the wire. While the telephone operator was trying to reach the R. Company by telephone, Mr. K. received an incoming call from Mr. M. of the R. Company; Mr. M. immediately informed Mr. K. that the B. Company had "pulled down" the bid. Mr. K. testified that he answered by explaining to Mr. M. that he was just trying to get him on the phone to confirm the sale to the B. Company.

Mr. L. of the B. Company testified that on the morning of July 11th, Mr. M. of the R. Company had called several times offering Caucho Balls at 53c. These calls at intervals of three or four minutes were in each case refused, Mr. L. always insisting that he would not pay more than 51½c per pound for this form of rubber. Finally Mr. M. called Mr. L. to tell him that he thought he could get a bid to sell rubber at 51½c and Mr. L. said that he gave to Mr. M. a bid at this price. A little while later Mr. L. received an offer of the same rubber at 50¾c from the T. Company, brokers, and accepted the same, pulling down his bid to Mr. M. of the R. Company. Mr. L. said that in his opinion fifteen minutes elapsed.

Shortly after Mr. L. had withdrawn his bid to the R. Company, he received a call from Mr. M. of the R. Company in which the latter requested to be allowed to bid the rubber to the A. Company, explaining that Mr. K. of the A. Company when the bid was first withdrawn had said that he was on the point of calling back and accepting the bid. Mr. L. said that he offered to bid 50¾c so that Mr. K. of the A. Company might come out of the trade without a loss provided he was purchasing the rubber from the S. Company, the same source as that from which the B. Company purchased. Mr. L. said that he received word from Mr. M. of the R. Company that Mr. K. of the A. Company had answered "51½ or nothing"; to this Mr. L. answered, "Nothing." Mr. L. further testified that at the time Mr. M. had expressed it as being his opinion that the bid had been allowed to stand an ample time to permit the B. Company to complete the transaction before it was pulled down.

At the request of Mr. K. of the A. Company, the R. Company, brokers in the attempted trade, were made parties to the arbitration. Mr. M. at the hearing testified that about ten minutes elapsed between the time he as broker presented the offer to purchase to the A. Company and the time he called the A. Company to pull down the bid.

Award of the Arbitrators

As no proof has been shown of the definite acceptance of the bid of the buyer, or of the prompt insistance by the seller of the existence of the contract at the time the bid was withdrawn, the Arbitrators find that no contract exists between the A. Company, as sellers, and the B. Company as buyers, of the nature described in the Submission to Arbitration.

Cost of arbitration and stenographic fees for the account of the A. Company.

Textile Courses for Rubber Men

TEXTILES play such an important part in the production of rubber goods of all kinds that rubber men located near New York City will be interested in several courses offered by Columbia University. Starting September 28, a course in "Cotton Goods Manufacturing and Finishing" will be given during the first half year and a continuation advance course will follow during the second semester.

Among the subjects covered are the growing of cotton fibre, and the most used types, preparatory processes, cloth construction and analysis, finishing, fibre yarns and cloth, standard market fabrics, comparison and analysis of many kinds of cotton goods, and cost and production calculations. The courses will be under the supervision of James W. Cox, Jr., M. E., consulting textile engineer and specialist.

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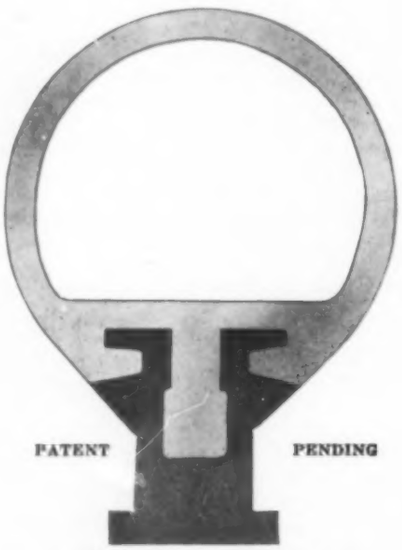

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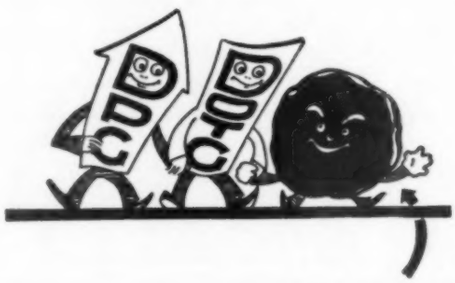

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EDITORIAL COMMENT

Keeping Up-to-Date

OVERPRODUCTION is no more accentuated as a condition in the rubber industry than it is in any of the other leading industries. A large part of this condition is generally due to the war expansion which left industry over-equipped in many lines.

What hope is there for this condition to be corrected in the next few years? The answer is found in improved machinery which has rendered and is rendering much of the post-war equipment obsolete. Manufacturers who do not keep pace with these improvements soon find themselves unable to compete and drop out of the picture. This has been particularly true in the tire industry. At times the placing of bankrupt plants on the market hurts an industry, as it enables new capital to pick them up at a fraction of their real worth and the new company becomes a worse competitor on account of the low investment in plant and equipment.

But it is significant that very few of the tire plants which have ceased operations in the last few years have been sold as a unit and started in operation again. The reason is obvious. Engineering and chemistry have made such rapid advances in tire making that after a plant lies idle for a short time, its machines, molds, and other appurtenances become obsolete, and resumption of operations is too hazardous an undertaking to attract new capital.

It is rapidly becoming true today that a machine becomes out-of-date before it is worn out. So true is this that manufacturers will not consider a new machine unless it will repay a substantial portion of the investment necessary within a year,—a pretty rigid test, to be sure, but many of the new machines are meeting it.

In the paper box industry, dumping of second-hand machinery on the market has become such a menace in the form of new competition from shoe-string, fly-by-night concerns that a concerted effort is being made to have manufacturers scrap machines as they are discarded. This will hardly be necessary in the rubber industry owing to the complicated technology of rubber manufacturing. The day is gone when a man can buy a few rubber mills, put them in an old barn, and start a rubber factory. A new rubber undertaking today needs to start with the newest and best and have plenty of capital to keep it up-to-date.

Native Rubber Again

THERE has been much discussion on the subject of just what effect the lower market price of crude rubber will have on the production coming from native holdings in the Middle East. Rubber circles both here and abroad have almost unanimously taken consolation in the viewpoint that such production is showing and will continue to show a decline. Just how wise such a judgment will prove in the long run must be left to the future. There would seem to be, however, another side to the picture.

The native planter, having been used to high profit from his trees, far higher than the average profits enjoyed by the British and Dutch companies, will naturally sit back and enjoy his savings for the time being. But what if crude rubber prices remain low over an extended period, a period long enough to have allowed the native planter to dissipate his surplus savings? It cannot be forgotten that his trees are still standing and that a half a loaf will appeal to him to be better than no loaf at all. At the present prices with his lower overhead he can still make a small profit rather than divert his holdings to some other use. The faith that the European plantation companies are placing on the decline in native production may, therefore, prove another one of those delusions which have disappointed rubber trading circles so many times before.

Export Tire Markets

THE foreign commerce department of the Chamber of Commerce of the United States has recently made an exhaustive survey of the foreign trade of the United States for the first half of the current year. In the list of exported commodities according to their value, tires rank twentieth with a total valuation of $16,541,000. This figure, however, is 15.6 per cent less than the value of tire exports for the corresponding period of 1927. In quantity the percentage of decline in shipments is practically the same. These figures, presented in this way, come somewhat as a surprise. They would indicate that the tire industry was not keeping pace with automobile export sales. With the production of tires at record peaks the export market would seem to call for closer attention and more concerted sales efforts.

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INDIA MAKES ALDERFER CHAIRMAN OF DIRECTORS

W. G. Klauss is Named President of Tire Company in Reorganization When Former Head is Appointed to Newly Created Position.

STOCKHOLDERS of the India Tire & Rubber Company at a meeting held on September 11 voted to accept the resignation of J. M. Alderfer as president of the organization, naming him as chairman of the board of directors, a newly created office. At a second meeting a few days later W. G. Klauss was selected to assume the position of president of the company.

The stockholders also approved the reduction of the number of directors from 11 to 7, all of whom will serve until 1931. It is also reported that an executive committee composed in part of three board members will act in an advisory capacity between directors' meetings and that plans have been made to lay aside a block of 15,000 shares of stock for disposal by the directors.

Stock Has Had Steady Rise

The stock of the India company has experienced a steady rise during the present year, its gains being surpassed only by the spectacular advances of Mohawk Rubber. From a low of 16 in January the stock never rose above 23 until early May when it suddenly shot up to 45 in a few days of trading and has since gained consistently until reaching a high of 57¾ this month. Rumors of merger plans and refinancing proposals were partly responsible for the sensational gains made when most rubber stocks were dropping, but the strong position of India in the trade proved that the rise was deserved.

The latest rumor to the effect that the interests responsible for the success of the Mohawk Rubber Company were to be associated with the new management of the India organization has been flatly denied by S. S. Miller, president of Mohawk.

It was in 1916 that Mr. Alderfer, with Paul Searles and others, organized the India Tire & Rubber Company and erected the first unit of the plant at Mogadore, O. Mr. Searles is now secretary and treasurer of the company. When the India company was started, its output was 100 tires a day. It now turns out many times that number and has a British factory and agencies in all parts of the United States. In a recent statement, Mr. Alderfer declared that India was in excellent financial shape and that sales and profits will run well over the figures of last year.

The Old Guard Rubber Corporation, New York City, received its papers of incorporation from the Secretary of State of New York on September 4. The new corporation was chartered with a capital of $100,000.

J. M. ALDERFER

AMERICAN RUBBER ADDS ADDITIONAL MACHINERY

The American Rubber Manufacturing Company has constructed an addition to its plant at Oakland, Cal., and installed new machinery. The expansion has been made necessary by an inceased volume of business in its hose, belting, packing and other mechanical goods.

J. Wright Ihlenfeld has been appointed manager for the Los Angeles district with headquarters at 458 South Spring street in that city. Mr. Ihlenfeld, a Marquette University graduate, has been with the firm for 20 months, having been manager of the fire protection department since the first of this year. William R. Goudie, who has been in charge at Los Angeles, will in the future have his headquarters at Oakland in the capacity of general sales manager.

De Lore Appoints Agent

Joseph A. McNulty, 114 Liberty Street, New York City, will take over the eastern sales territory for the C. P. De Lore Company, St. Louis, manufacturers of Baryta white barytes. Mr. McNulty will begin this work on October 1 and will cover both the rubber and paint fields. Stocks are to be carried by the company at Boston, Philadelphia and New York.

GOODRICH ERECTING $1,500,000 WAREHOUSE

Construction of Nine-Story Building Will Mark First Step in Program of Expansion Involving Expenditure of Nearly $5,000,000.

THE B. F. Goodrich Company on September 9 awarded a contract for the construction of a nine-story warehouse at Akron to cost $1,500,000. The new building, which is to be erected on Falor Street, will be 260 feet long and have a depth of 148 feet. It will be of steel and concrete faced with brick. With a floor space of 316,000 square feet, it will provide storage capacity of 4,500,000 cubic feet.

Connections with other Goodrich buildings will be by means of bridges and a system of underground tunnels. The structure will be the fourth largest manufacturing building under one roof in Ohio. According to Goodrich officials, this marks the first step in an expansion plan involving an expenditure of between $4,000,000 and $5,000,000.

The site of the new building is at present occupied by the police department, employment bureau and cafeteria. All commodities manufactured by Goodrich except footwear will clear through the new structure. It was for this purpose that the huge footwear building, second largest manufacturing plant in the state, was constructed 18 months ago.

Eight Floors for Warehouse

The first 8 floors of the new building will be devoted to warehouse purposes, but on the ninth floor will be located one of the best appointed dispensaries in the rubber industry. Complete, modern hospital equipment is to be installed. A special hospital elevator, having a capacity of 4,000 pounds and a speed of 450 feet a minute, will serve all floors. It will reach the street level at the sidewalk for emergency purposes.

Four of the latest type electric driven freight elevators will handle warehouse commodities. These elevators are 10 feet square and have a 5-ton capacity. High-speed gates, opening or closing in 3 seconds, will speed up loading and unloading movements at each floor.

Finished goods can be run into the new building from every department of the Goodrich organization without outside passage. On the east side of the warehouse there is to be provided ground floor space for 16 large trucks. This will serve as a storage garage for Goodrich trucks and for outside motor transports remaining overnight. On the west side 2 railway tracks will provide facilities for loading 10 cars at one time.

LITCHFIELD IN DANGER ON DIRIGIBLE FLIGHT

Goodyear President and Six Other Passengers Imperiled Aboard Puritan as Airship Is Lashed by Wind and Rain Storm Above Detroit.

PRESIDENT P. W. LITCHFIELD of the Goodyear Tire & Rubber Company and 6 other passengers aboard the company's new dirigible Puritan narrowly escaped death on the night of September 11 when a terrific gale and rain storm nearly prevented the ship from making a safe landing at the Ford Airport in Detroit.

The blimp was tossed about like a toy in the darkness that accompanied the storm, and atmospheric conditions dropped it to an altitude of less than 1,000 feet above the city. Unable to make any progress against the 50-mile gale, the ship seemed many times about to be dashed against the tops of chimneys and tall buildings by wind currents. Once the dirigible completely turned over under the buffeting of the gale.

City traffic was blocked as thousands of pedestrians and motorists stopped to watch the struggle of the airship with the storm. The dangerous position of the dirigible and its crew was further increased by the darkness which prevented them from sighting the lights of the airport.

When Jack Boettner, the pilot, got his bearings, the ship remained stationary for 30 minutes over the outskirts of Detroit. The motors were turning at the rate of 1,700 revolutions a minute which ordinarily would have given it a speed of 55 miles an hour. However, the gale several times increased in strength until the ship was forced astern and it seemed that a landing was hopeless. When the gale first struck the ship, it was with such terrific force that the blimp was compelled alternately to plunge toward earth and shoot into the air.

It was only the skill of Boettner and his mechanic, Vernon Smith, that prevented a serious catastrophe. The dirigible was safely moored at the Ford Airport after a thrilling 45-minute fight with the elements.

In addition to President Litchfield, Boettner and Smith, those aboard the craft included Herbert Maxson, of the Goodyear aeronautical department, and Don Pollard, Lawrence McCracken and Karl F. Ziesler, newspapermen. Two days after its experience in the storm, the ship returned to Akron.

AMERICAN HEEL COMPANY ORGANIZED IN ILLINOIS

The American Heel & Rubber Company, Belleville, Ill., has just received its incorporation papers and is preparing to start operations in the manufacturing of rubber heels, mechanical rubber goods, and metal specialties. The company has been organized with $25,000 of preferred stock and 25,000 shares of common with no par value.

The incorporators of the new organization are Alfred W. Wade, Edwin P. Schmidt, Otto Schneider, J. K. Montgomery and F. F. Williams.

New Schrader Tire Gauge

A new tire gauge built especially for use in garages and service stations is announced by A. Schrader's Son, Inc., 470 Vanderbilt Avenue, Brooklyn, N. Y. It is known as the Schrader 6040 Service Tire Gauge.

The important feature of this new gauge is its ability to test any pneumatic tire from low pressure pleasure car balloons to

Calibrated from 10 to 160 lbs.

high pressure truck and bus tires. It is said to register accurately from 10 to 160 pounds. The first 60 pounds are calibrated in 1-pound graduations for testing balloon tires, and the remaining 100 pounds are marked in 5-pound graduations.

The new gauge is fitted with a 3-inch extension which makes it easy to use. Due to its size, the gauge will not easily be mislaid or taken from the service station by mistake.

Milestone Rubber Moves

The offices and shipping departments of the Milestone Rubber Company, maintained for several years at East Liverpool, O., have been moved to Chester, W. Va., from which city shipments are now being made.

Hood Branch at Hartford

A tract of land and buildings at Edward and Walnut Streets, Hartford, Conn., recently sold by the Coca Cola Bottling Company, are to be leased to the Hood Rubber Products Company. C. W. Helm of the Helm Tire Service Corporation will have charge of the new branch office when it is opened.

Fisk Branch Near Completion

The $100,000 branch warehouse being constructed for the Fisk Rubber Company at Los Angeles is nearing completion and will be ready for occupancy by December 1. With a frontage of 150 feet, the building will be 3 stories in height and have 16,500 square feet of floor space.

Aetna Adds Rubber Flooring

The Aetna Rubber Company is preparing to start production of rubber flooring and rubber covering, new lines for this organization. The present business of the company in battery cases and other automotive rubber products is running at a high rate of activity with orders on hand sufficient to keep both the Cleveland and Ashtabula, O., plants running for at least two months.

Rubber Buyer to Lecture

Robert C. Kelley, purchasing agent and a director of the Converse Rubber Shoe Company, Malden, Mass., will give a course of 32 lectures on purchasing and commodity analysis at the Northeastern University School of Commerce and Finance, Boston. His course will start with the opening of the fall semester.

GOODYEAR UNIVERSITY TO OPEN MANAGEMENT SCHOOL

Special courses for foremen and supervisors will be offered at the Goodyear Industrial University when the School of Management of that institution is opened on October 1. In preparing these courses every possible need of foremen and supervisors of the factory and staff departments of the Goodyear Tire & Rubber Company has been anticipated and all the subjects offered tend to develop leadership and efficiency.

The term of the Management School is six months in length, starting October 1 and continuing until March 25, 1929. Among the subjects offered are English, business arithmetic, advanced mathematics, business law, organization, rubber manufacturing practice, chemistry, blue print reading, motion study and job analysis, foremanship, economics, effective speaking and psychology of instruction.

The regular courses for employes in the School of Business and the School of Engineering opened on September 17. All courses are given Goodyear workers at low enrollment charges and with substantial refunds to those who complete the full term satisfactorily.

MURRAY RUBBER COMPANY OPENS A BOSTON BRANCH

A branch office of the Murray Rubber Company, manufacturers of Murray and Empire tires and tubes as well as mechanical rubber goods, has been opened at 96 Brookline avenue, Boston, Mass. A full stock of goods will be carried there for distribution to New England dealers.

Karl W. P. Reece, as New England manager of the mechanical division and branch operations, will be in charge together with M. J. Dickinson as manager of the tire division.

AKRON GROWTH FORESEEN BY TELEPHONE COMPANY

That the rubber business in the Akron district will increase from 50 to 60 per cent in the next 20 to 25 years is indicated by an extensive survey of Greater Akron recently conducted by the Ohio Bell Telephone Company. This was made the subject of an address by J. B. Anderson, an official of the telephone company, before the Rotary Club of Akron recently.

The survey states that more than 80 per cent of the industrial wage earners of Greater Akron are employed by rubber concerns. Outside the rubber industry, about 10 per cent of the city's wage earners are employed in such basic industries as foundries, clay products, etc., the survey shows.

The telephone company's estimates indicate that the number of industrial wage earners in Akron should increase to between 70,000 and 80,000 by expiration of the 20- or 25-year period which the survey designates as the "ultimate date." The survey, which includes Cuyahoga Falls and Barberton, Akron suburbs, was made by a large force of field men who covered more than 2,500 miles by automobile.

HOLSTEIN RUBBER FIRM TO LOCATE IN DANBURY

The Holstein Rubber Company, Inc., of Hartford, Conn., manufacturers of rubber tiling, will occupy a large one-story factory building in Danbury, Conn., as soon as the structure is completed and equipment installed. Upon starting work in the new building, the company will add a Danbury brand tile to its present line of Non-Destructible Rubber Tiling.

When production is under way, the plant will be superintended by Perley Hammond who has been connected during the past 23 years with the Hood, Goodrich, Firestone, Faultless and Panther rubber companies. The production supervisor will be Samuel Rosenblatt, formerly with the Hood Rubber Company, the Charles T. Wilson Company, the Braintree Rubber Cement Company, and the Panther Rubber Company. Mr. Rosenblatt has been identified with the rubber industry since 1902.

The Holstein Company has been making rubber flooring for more than 30 years and produces its tiling in 75 distinct colors in reproduction of the world's most beautiful marbles.

GOODRICH COMPANY SUED OVER CALENDER PATENTS

Claiming that he assigned a patent to the B. F. Goodrich Company when he thought he was signing papers of application for a patent, James E. Bowen of Akron, has appealed his case to the United States circuit court of appeals at Cincinnati. Bowen, a calender machine operator, said he was employed by the company at the time he invented a device for trimming excess rubber from friction fabric designed to be used with calender machines.

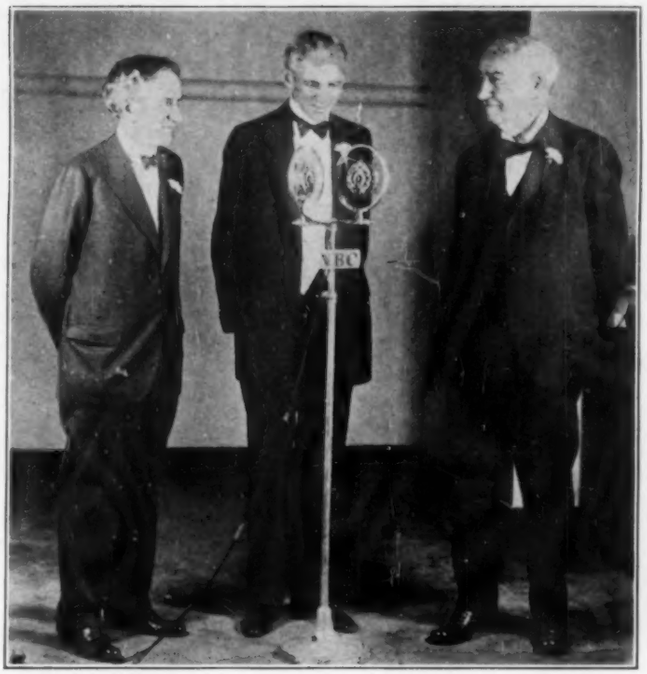
He submitted the device to company officials, he said, and attorneys tendered papers for his signature, which he claims he thought were simply application forms for a patent. In his appeal he charges that he later learned one of the papers was an assignment of the patent to the company. His case had previously been dismissed by Judge Paul Jones in the Cleveland federal court, the justice holding that Bowen had failed to show fraud.

AKRON RUBBER MFG. CO. TO MAKE RUBBER HEELS

The Akron Rubber Manufacturing Company, Inc., located at 261 Broadway, New York City, has started in the manufacture of rubber heels and soles for the findings trade throughout the country. Charles Boskowitz, founder of the company, has been known in the trade for the past 20 years. The company's heels and soles will be marketed under the trade name of "Akron."

Goodyear Coast Output High

The Goodyear Tire & Rubber Company of California is producing 10,000 tires and 8,500 tubes daily at its Los Angeles plant and is preparing to increase the factory capacity to 12,000 tires daily.



OPENING THE RADIO SHOW

Harvey Firestone, Sr., Henry Ford and Thomas A. Edison before the microphone at the official opening of New York's annual Radio Show at Madison Square Garden

GOODYEAR EMPLOYES RUN HOSPITAL ASSOCIATION

With a membership of 15,000 out of the 18,000 employes who are eligible, the Goodyear Hospital Association of the Goodyear Tire & Rubber Company is operating successfully after its first year of existence. In 12 months the organization has paid out for hospital care $18,260, and after allowance for taxes, the association was able to accumulate a reserve of approximately $47,000.

This surplus is earning 5 per cent interest and, with the gross of operating cost less than 3 per cent of the income, little of the amount collected for dues and fees is being consumed. During the year a total of 556 members were cared for, the association allowing $21 a week for hospital room and board and also assuming the payment of X-ray fees where necessary. These expansions of benefits, however, still leave a sufficient reserve for emergencies such as an unusual epidemic of sickness or an accident that might affect a great number of members at once.

TRANSATLANTIC AIRPLANE NOW HAS QUEBEC TIRES

The German Junkers airplane Bremen which made the first successful westward flight across the north Atlantic has been equipped with a new set of Quebec vacuum tires to replace the original ones which burst upon landing on Greenley Island. The new tires of the same cross section dimensions as the original set were designed and manufactured by the Frontenac Rubber Company of Quebec City. Special bead construction was necessary for the 21½-inch diameter wheels.

The assembled plane has been on exhibition in the city of Quebec since August 5 and was a feature of the annual Provincial exposition from September 1 to 8.

NORTHERN RUBBER HEADS ARE HOSTS TO DEALERS

G. A. Kerr, Louisiana sales director, and 10 tire dealers from that state were guests of the Northern Rubber Company, Barberton, O., during the second week of September. The dealers stayed at the Portage Hotel, Akron, and spent considerable time visiting the Northern factory and inspecting successful tire shops in Akron and Cleveland.

At a special sales meeting at the Barberton plant on September 13, talks were given by Carl Palmen, Akron manufacturer, on the value of trade marks; by George E. Lees, Cleveland, on dealer helps in advertising; and by Owen Mounihan, general sales director, on the Northern line.

TRIANGLE TIRE REPORTS PRODUCTION INCREASING

The factory of the Triangle Tire & Rubber Company at Canton, O., is now turning out approximately 600 tires a day, according to M. C. Wyatt, treasurer of the firm. The company has increased its production each year since it began operations, and more than 100 men are on the payrolls.

"Our employment has been steady this year," Mr. Wyatt said, "and ranks with 1927 in that respect. Production, too, has been on a par with that of last year despite a slow spring and our outlook for fall and winter is excellent."

The Somerset Rubber Reclaiming Company, Millstone, N. J., has just increased its force by a night shift to handle added business.

CATALPO!

CARBON BLACK MARKET SHOWS MORE STRENGTH

New Production Tax Levied by State of Louisiana, Together With the Decline in Manufacturers' Stocks, Has Brought High Price Levels.

THE recent strengthening in the carbon black market has two causes: the decline of stocks in the hands of the manufacturers, and the new production taxes imposed by the State of Louisiana. In 1927 there was a decline in stocks, according to the United States Bureau of Mines report, amounting to 26,000,000 pounds, and estimates for the first seven months of 1928 indicate that stocks have continued to decline by over 2,000,000 pounds per month. Stocks on July 31 are estimated at 57,000,000 pounds as against 108,000,000 pounds on January 1, 1927.

The new taxes in Louisiana have increased the cost of production there by about six-tenths of a cent per pound. Since Louisiana produced 62½ per cent of all the carbon black produced in the world in 1927, it is natural that the Louisiana producers should feel that they can pass on at least a portion of this tax to the consumers of carbon black.

No Shortage Is Expected

However, no shortage of carbon black is imminent. More new construction of plants has been undertaken this year than in any previous year in the history of the industry, not even excepting the phenomenal year of 1923. The effect of this new construction on production will not be fully evident for several months.

The Godfrey L. Cabot, Inc., is reported to have already increased their rate of production in Texas by 28,000,000 pounds annually since the first of the year and now have under construction an addition to their plant in Pampa which will make their total increase in capacity in the state this year over 34,000,000 pounds.

COAST RUBBER COMPANY INCREASES PRODUCTION

According to Louis S. Budo, president of the firm, the Coast Tire & Rubber Company has stepped up its production schedule to meet the increasing demand for its products. Mr. Budo says that the company is constantly making changes to improve the efficiency of its plant.

"August was one of the largest months in the history of the organization in both tire and tube business," he commented. "While most of our sales were divided between southern California and the northern part of the state, Washington and Oregon took a goodly portion of the output."

CATALPO!

Seven Tons of Belting

With a total length of 1,225 feet, the 42-inch conveyor belt shown above was manufactured recently for the Youngstown Sheet & Tube Company by the Republic Rubber Company, Youngstown, O., and is of that firm's Super Excelo brand. The height of the roll which this belt made was 9 feet, and the weight was 13,908 pounds.

New Rubber Industry Patents

Four Akron inventors recently received patents from the government for devices connected with the rubber industry, all assigning their rights to prominent manufacturing companies. Burton B. Annis patented a new valve and Harry B. Waner a speed controlling device for continuous strip feeding purposes, both being assigned to the B. F. Goodrich Company. Charles J. Jahant assigned his patent of a golf club to the General Tire & Rubber Company and Richard T. Griffiths his new bottle nipple to the Miller Rubber Company.

Discuss Akron Traffic

At a meeting held in the general offices of the Goodyear Tire & Rubber Company, 25 representatives of Akron industrial and commercial concerns discussed ways and means of alleviating traffic congestion in that city. F. O. Washam, manager of the Goodyear cafeteria, as chairman of the traffic committee of the East Akron Board of Trade, presided at the meeting, and H. G. Wilson, manager of publications for Goodyear, also took an active part.

A certificate of incorporation was granted to the Schavoir Rubber Company, Stamford, Conn., on September 5. Of the authorized capital of $90,000, the incorporators report $2,000 as paid in. The incorporators were A. L. Schavoir, K. F. Schavoir, Fred H. Schavoir and E. B. Schavoir.

Ervin C. Pope, superintendent of the Cleveland Liner & Manufacturing Company, Cleveland, O., became a proud father on September 11. The youngster has been christened Alton Rash Pope. Mr. Pope is the son of F. A. Pope, president of the company.

K. & W. RUBBER COMPANY INSTALLING MACHINERY

A considerable amount of new machinery is now being installed by the K. & W. Rubber Company, Delaware, O., to take care of the demand for "Airo Cushion" products. The firm is also considering resuming the production of "Airotank" inner tubes in the near future. Several new items have been developed by this organization during the last year, and all are said to have found a ready sale on the market.

Wheatley Rubber Expanding

The Wheatley Rubber Company, Fond du Lac, Wis., will shortly begin the manufacture of truck tires, according to officials of the firm. The company has increased its output of automobile tires to about 300 daily and is contemplating further increases in the near future. The Wheatley organization took over the Latex Tire Company in Fond du Lac about a year ago.

New Mansfield Tire

The Mansfield Tire & Rubber Company, Mansfield, O., has announced a new automobile tire which is said to contain much more rubber than tires of ordinary construction. According to George W. Stephens, president of the company, it has thicker cords and more of them with extra layers of rubber between the plies. It will be known as the Mansfield "Double Service" tire.

Seiberling August Profit

The Seiberling Rubber Company showed a profit of $130,267 for the month of August before depreciation and federal taxes, according to a company report. F. A. Seiberling, president of the firm, in commenting on the statement, said, "I am looking forward to a very successful remainder of the year not for the Seiberling company alone, but for the entire industry."

Alexander MacAdam Paul

Alexander MacAdam Paul, president of the Davidson Rubber Company, Charlestown, Mass., died suddenly at his home in Winchester, Mass., on September 14. Born in Halifax, N. S., on April 13, 1867, and naturalized as an American citizen in 1890, Mr. Paul was a pioneer in the rubber industry.

From 1899 to 1907 he was associated with the Boston Woven Hose & Rubber Company and in the latter year bought the Davidson Rubber Company, acting as sole owner until his death. He was director of the New England Rubber Corporation from 1901 to 1905 and from 1907 to 1909 and a director of several other corporations. He was the fifth president of the New England Rubber Corporation and from 1915 until his decease was an ex-officio director of the Rubber Association of America.

The Swerling Trading Corporation, New York City, has received a certificate of incorporation for the purpose of engaging in the rubber goods business. The new company has an authorized capital of $200,000 preferred stock and 4,000 shares of common.

Names in the News

P. W. Litchfield, president of the Goodyear Tire & Rubber Company, has been named a director of the new Akron Industrial Foundation. His election took place at a meeting of the organization's "committee of 50" on September 14.

David Newhall has been appointed Philadelphia office manager for the Manhattan Rubber Manufacturing Company. He succeeds John S. Latta, who recently resigned to enter other work.

Julius Schmid, president of Julius Schmid, Inc., New York City, importers and manufacturers of rubber sundries, will return to the United States on the S.S. *Resolute*, September 28, after an extensive trip in Europe. Mr. Schmid spent considerable time in Hungary where his firm has connections with the Ungarische Gummiwaarenfabriks-Aktiengesellschaft, (Hungarian Rubber Goods Factory, Ltd), Budapest.

Dr. A. A. Somerville, of the R. T. Vanderbilt Company, New York City, sailed on the *Berengaria*, September 19 for a six-week trip in France and England. He will spend a week in Paris and will reach London in time to deliver a paper before the Institution of the Rubber Industry on October 1. A similar paper will be read to the Birmingham section of the I. R. I. on October 11, and Dr. Somerville is expected to return by November 1.

Hugo Myer and Walter Myer have had the western management of the sundries division of the Seiberling Rubber Company assigned to them and have established offices at 58 East Street, Chicago, Ill.

William E. Begley, of Plant Two, Firestone Tire & Rubber Company, was the recent winner of a $500 prize for helpful suggestions in that organization.

Raymond W. Kent and Morris Omansky, both well known in the rubber industry, have joined the technical staff of Arthur D. Little, Inc., research chemists and engineers of Cambridge, Mass.

J. Victor Macky, a director of Trucks, Ltd., Auckland, New Zealand, importers of American commercial vehicles, was a recent visitor to the Akron factories of the Firestone Tire & Rubber Company.

Captain Walter L. Glass, manager of paper mill sales for the B. F. Goodrich Company, was just awarded a silver star by the United States government for acts of heroism in the World War. During the war he was commander of Company C, 106th machine gun battalion.

Jack A. Linforth, export manager of truck and bus tire sales, and Herman B. Post, export manager of mechanical goods sales, of the Goodyear Tire & Rubber Company, both returned to Akron recently after three months abroad during which time they visited several European countries.

Harvey S. Firestone, president of the Firestone Tire & Rubber Company, will be present at Elizabethton, Tenn, when Herbert Hoover speaks there on October 6. Others who will attend the meeting for the Republican nominee are Henry Ford and Thomas A. Edison.

William G. Pickrel, one of the directors of the Dayton Rubber Manufacturing Company, is Lieutenant Governor of the State of Ohio. Mr. Pickrel, who is a prominent

WILLIAM G. PICKREL

Dayton attorney, says that all officials of the company are encouraged by the civic activity of J. A. MacMillan, president of the firm, to give some of their time to community and state affairs.

W. B. Orr, president of the Orr-Brown & Price Company, wholesale druggists, of Columbus, O., and 12 members of his sales staff were luncheon guests of the B. F. Goodrich Rubber Company September 7 at the City Club of Akron. H. A. Bauman, manager of the Goodrich sundry sales department, acted as personal host for his company.

George T. Oakley has taken the place of the late Edmund L. Stimson as manager of the mechanical goods department of the Essex Rubber Company, Trenton, N. J.

A. N. Alexander, formerly in charge of mechanical goods sales for the Murray Rubber Company, Trenton, N. J., has been appointed assistant to the president of the Hood Rubber Company, Watertown, Mass. His place in the Murray organization is now being filled by B. M. Callen and Howard M. Stoner.

Leslie C. Myers, formerly with the Waldreth Supply Company, Des Moines, Ia., is now on the sales force of the New York Rubber Company, Beacon, N. Y.

W. F. Goff, formerly of the Star Rubber Company, is now technical superintendent of the Amazon Rubber Corporation, a recent reorganization of the old Amazon Rubber Company.

Lewis Graham, of the Goodyear Tire & Rubber Company, has received a check for $400 for making the best money-saving suggestion in the organization during August. A second prize of $175 was awarded to Jack I. Wills

W. A. Briggs, for many years in charge of the service department of the Boston Woven Hose & Rubber Company, has been appointed sales manager of the firm. Other appointments have been those of R. J. Owens as merchandise manager and of H. F. Maxon as district field manager in charge of New York, Pennsylvania, New Jersey, Delaware and Maryland territory.

M. W. Conant, formerly of the Miller Tire & Rubber Company, was appointed to the publicity department of the B. F. Goodrich Company on September 8. He is a former newspaper man.

Walter W. Holt, formerly with the United States Rubber Company, has been appointed assistant sales manager of the Mennen Company, Newark, N. J.

David Craig has joined the staff of the B. F. Goodrich Company at Akron as a chemist. He recently completed his work for a Ph.D. degree at the State University of Iowa.

Clifton E. Slusser, vice-president and factory manager of the Goodyear Tire & Rubber Company, spoke before more than 200 members of the Goodyear Foremen's Club at their opening fall meeting September 15.

William C. Ehrenfeld, formerly president and general manager of the Dural Rubber Corporation, Flemington, N. J., has purchased the plant of the Doylestown Rubber Company, Doylestown, Pa. He is getting the factory ready for the manufacture of rubber specialties. The new concern will be known as the Rubber Products Corporation.

William J. B. Stokes, treasurer of the Thermoid Rubber Company and president of the Joseph Stokes Rubber Company, Trenton, N. J., celebrated his 71st birthday on August 22.

Timely Financial News

TIRE COMPANY STOCKS MAKING STEADY GAINS

Mohawk Rubber Is Sensation of Fortnight with Rise of 54 Points as Practically All Shares Register Increases in Active Markets.

THE past two weeks witnessed considerable activity in trading in shares of rubber companies on the different exchanges. Practically all rubber stocks showed consistent gains during the period, and Seiberling and Mohawk soared to new high levels for the year.

Mohawk Rubber common was the most spectacular issue of the fortnight, going from 170 to 224 in the course of active trading on both the Chicago and Cleveland exchanges. On September 20 it made a final spurt of 14 points, going from 210 to its high mark for 1928 with several thousand shares being sold during the day. Mohawk common, which was selling at 20 during January of this year, has had one of the most sensational rises in rubber security history.

Seiberling at New Peak

Active trading also sent Seiberling common to a new top price of 50¾, although later recessions brought it down to 48⅜ in the closing quotations. Norwalk preferred was another stock that advanced to its peak of the year, closing at 48 on the New York Stock Exchange.

The reorganization of India failed to influence the selling price of the company's shares to any extent, but the stock, which was offered at 16 at one time this year, is now holding firm at 55. Other companies whose securities rose in the trading were Firestone, Goodrich, Goodyear, Hood, Kelly Springfield, Lee, Miller and U. S. Rubber. Goodyear was selling at 68⅛ on the closing day of the period, but fell back slightly to register a net gain of 5½ points at 67½.

The only marked loss was evidenced in the case of Fisk first preferred, which declined from 75½ to 63, less than 5 points above its low for the year. U. S. Rubber preferred dropped back 2½ points to 69, and other stocks to show declines were Firestone preferred, Fisk common, Goodrich preferred, and Ajax.

The New Jersey Rubber Company, New Brunswick, N. J., has filed a certificate decreasing its capital stock from $300,000, represented by 3,000 shares, to $50,000 preferred, represented by 50,000 shares.

CATALPO!

Canadian Goodyear Dividend

The Goodyear Tire & Rubber Company of Canada has declared an extra dividend of $1 on the common stock and the regular quarterly dividends of $1.25 on the common and $1.75 on the preferred. All of these dividends are payable October 1 to stock of record September 15.

LEE RUBBER & TIRE NET $110,000 FOR 9 MONTHS

The net profit of the Lee Rubber & Tire Corporation for the first nine months of its fiscal year, ending July 31, is estimated at slightly more than $110,000 after all charges and inventory adjustment. Earnings in August ran between $50,000 and $60,000, and it is probable that September profits will maintain this level.

The company has just concluded a contract with the Warner-Quinlan Company whereby the latter agrees to handle Lee tires exclusively in its 128 service stations in Greater New York.

General Tire Dividend

The General Tire & Rubber Company has declared the regular quarterly dividend of 1½ per cent on the 6 per cent preferred stock, payable September 30 to stock of record as of September 20.

The quarterly dividend on the 7 per cent preferred stock of Dunlop Tire & Rubber Goods Company, Ltd., for the quarter ending September 30 is announced as payable October 1. This is the 19th consecutive dividend, constituting a record for the industry.

The Hood Rubber Company has declared regular quarterly dividends of $1.88 on the 7½ per cent preference stock and $1.75 on the 7 per cent preferred, payable November 1.

Late Stock Prices

	Last Price		—1928—	
	Sept. 20	Sept. 4	High	Low
Ajax	8¼	9	14⅝	7½
Falls	8½	—	13	4½
Faultless	30½	—	39¾	30
Firestone	177¾	176¼	232	170
do. 6% pfd.	108½	109	112	109
Fisk	11⅝	11⅞	17¾	8⅞
do. 1st pfd.	63	75½	91½	58½
General	170	—	190	165
do. pfd.	98½	—	111	98
Goodrich	82⅛	79	99⅝	68½
do. pfd.	110¾	111¾	115⅝	109½
Goodyear Com.	67½	62	72½	45⅛
do. pr. pfd.	97½	—	99½	92½
Hood	30⅝	29	43	25
India	55	54½	57¾	16
Intercontinental	10½	—	21¾	8⅛
Kelly Springfield	22	18⅞	27⅝	15
do. 1st pfd.	70	—	—	—
Lee	19½	19⅛	24½	17¼
Miller	22½	22⅛	27	18⅞
do. pfd.	85½	—	97½	70
Mohawk	224	170	224	29¾
do. pfd.	93	—	95	55
Norwalk	5⅝	—	7½	2½
do. pfd.	48	—	48	33¾
Seiberling	48⅝	46	50¾	35
do. pfd.	105½	—	107½	102
U. S. Rubber	38⅞	38½	63¼	27
do. pfd.	69	71½	109⅜	55

GRASSELLI CHEMICAL IS ADMITTED TO EXCHANGE

The committee on stock listing of the New York Stock Exchange on September 11 announced the admission of securities of the Grasselli Chemical Company, New York, makers of rubber chemicals, to the trading list. The shares admitted include $13,724,200 of 6 per cent cumulative preferred stock and 746,959 common shares without par value.

In its report of its operations for first six months of 1928, the Grasselli company showed a net income after all charges, including federal taxes, of $2,431,843 as compared with a net income of $3,253,453 for the entire year ending December 31, 1927. After preferred dividend requirements, the six months' earnings are equivalent to $2.70 a share on the common stock outstanding, including 100,000 shares of common stock sold by the company subsequent to June 30.

KENDALL COMPANY WILL BUY OUT BAUER & BLACK

The Kendall Company, one of the largest manufacturers of hospital supplies, is to acquire all the assets of Bauer & Black, makers of rubber and other goods for druggists and hospitals. After negotiations are completed, the Kendall organization will own or control through its subsidiaries plants located at Chicago, Ill., Walpole, Mass., Slatersville, R. I., Paw Creek, N. C., and Camden, Edgefield and Newberry, S. C.

The cash portion of the purchase price of Bauer & Black was obtained by the issue of 40,000 shares of the Kendall Company cumulative and participating preferred stocks, series A, entitled to a regular annual dividend of $6 a share and with stock purchase warrants attached and of $6,500,000 of the company's 20-year 5½ per cent debentures, series A. The stock was offered at $97 a share and the debentures at $95.

WOONSOCKET AND REVERE VOTE CUTS IN CAPITAL

The Woonsocket Rubber Company of Woonsocket, R. I., and the Revere Rubber Company of Providence, R. I., both subsidiaries of the United States Rubber Company, voted to reduce their capital stock a few days ago. In the case of Revere the outstanding preferred will be reduced from $2,500,000 to $500,000 and the common from $2,000,000 to $500,000. The capital of the Woonsocket Company will be reduced from $1,500,000 to $500,000.

The Seiberling Rubber Company has declared the regular quarterly dividend of $2 on the preferred shares of the company. This is to be payable October 1 to stock of record as of September 20.

Rubber Goods and Specialties

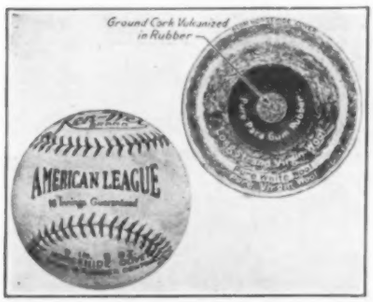
Hunting Suit

There are several features in this "Dryback" hunting suit offered by the Dryback Corporation, 93 Worth Street, New York City. Rubberized bottom lining makes the double entrance game pockets blood-proof and gives a sanitary, easily washable lining.

A deep inside breast pocket with snap fastener is suitable for holding licenses, thermos bottle, etc. The body and top sleeve are full lined with a waterproof corduroy collar and sleeve facing. The pendulum gusset sleeves provide full ventilation as well as perfect freedom for sudden moves in shooting, according to the manufacturer.

Rubber-Centered Baseball

Because of the fact that ordinary baseball centres of cushion rubber or cork form an air space that deadens the resiliency of the ball, this Ken-Wel American League Base-



ball has a centre constructed of pure Para gum rubber with a portion of ground cork vulcanized in the rubber itself, eliminating any air space. Over the rubber centre is long strand virgin Australian wool and the usual alum horsehide cover. Every ball received two coatings of rubber cement. The best quality white finishing yarn is used for the last winding, and the covers have patented level seams that assure less air resistance. The ball is guaranteed by its manufacturer, the Ken-Wel Sporting Goods Company, Inc., Utica, N. Y., for 18 innings against softening, ripping or losing its shape.

Ferry-Gator Toy

As an addition to its line of imprinted balloons and rubber sundries, the Wooster Rubber Company, Wooster, O., is now offering to the toy trade a novelty called the Ferry-Gator. This consists of a balloon body with lithographed parts to be attached at each end to resemble the head and tail of an alligator. A cut-out strip is also provided to give the idea of passengers riding on top of the animal. The entire toy is packed for selling in a flat envelope, but the balloon body alone may be inflated to a length of 16 inches. Instructions for assembling the device are given in detail on the envelope.

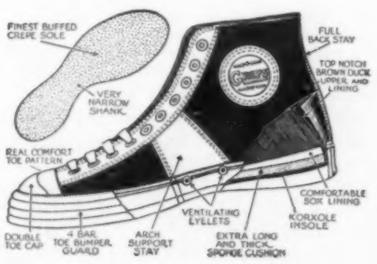
Horse Medicine Bottle

These rubber bottles are made for the purpose of administering medicine to horses or cattle. They are molded from pure rubber and are said by the manufacturer to be extremely tough and durable, assuring long

wear. Veterinarians throughout the country have found them practical and have endorsed their use. The manufacturer is the New York Belting and Packing Company, Inc., 91-93 Chambers street, New York City.

Basketball Shoe

Scientific construction is claimed by the Beacon Falls Rubber Shoe Company, Beacon Falls, Conn., for this Top Notch "Gra-Grip" basketball shoe. A double toe cap and a 4-bar toe bumper guard give protection to that part of the shoe. The sole is of buffed



crepe with a very narrow shank, and the insole is of cork. Brown duck is used for the upper and lining, and other features are ventilating eyelets, an arch support stay, a full back stay, and a comfortable sox lining.

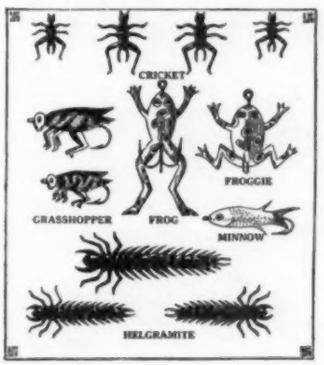
Rowing Machine Exerciser

Combining the functions of a rowing machine, an abdominal reducer and body building exerciser, this apparatus is being offered under the name of the "Seat of Health" by the Health Developing Apparatus Company, Inc., 550 Van Alst avenue, Long Island, N. Y. According to the manufacturer, it exer-

cises the ankles, calves, knees, thighs, hips, abdomen, back, fingers, forearms triceps and shoulders at the same time while massaging by natural body movement the stomach, diaphragm and entire intestinal tract. The machine itself is attractively finished in white enamel and combines lightness of weight with rigid construction. The elastic bands that furnish the resistance for the exerciser are of strong materials and adjustable.

Rubber Bait Assortment

A new soft rubber bait assortment made up of six different baits that are said to have proven successful fish getters over a number of years is offered to the sports world by W.



J. Grube, Delaware, O. The assortment is made up of two trout size crickets, two trout and blue gill size crickets, one small "froggie" fitted with single hook, one small hollow frog fitted with treble hook, one bass size grasshopper, one crappie size minnow, one medium size helgramite, suitable for bass, rock bass or crappies and one small size helgramite. All are said to be real imitations and are made of the best Para rubber and fitted with hollow point imported hooks that are extremely keen and flat forged to give stiffness.

Rubber News Around the World

TROPICAL TIRE STORAGE PRESENTS DIFFICULTIES

The problem of storing tires in the tropics in such a way as to protect them from deterioration has proved to be a difficult one even after many years of experiments. In the Belgian Congo pneumatic tires are stored by L'Union Miniere du Haut Katanga, an important company, in specially constructed cellars of concrete sunk in the soil and extending upwards to a height of six feet above the soil level.

These shelters are pierced with a number of openings arranged to restrict the entrance of light, but to permit the passage of air. Humidity must be less than will rust a piece of iron left in the cellars, and even with these precautions the company tries to avoid keeping stocks larger than will last three or four months.

Another Congo concern, La Forminiere, besides sheltering its tires from light and moisture in well-aired rooms, places open receptacles containing gasoline about the tire warehouses to obtain an atmosphere slightly tainted with oil.

LONDON BUSES EQUIPPED WITH PNEUMATIC TIRES

It is announced that the London General Omnibus Company, which has a virtual monopoly of the omnibus traffic in London, will shortly put into service 75 new double-deck omnibuses, each weighing 8 tons, seating 50 passengers, and fitted with pneumatic tires. Of the existing omnibuses, 100 are being altered so that they can also be equipped with pneumatic tires, and, if the experiment is successful, this type of tire is likely to be used throughout the company's fleet of more than 5,000 buses.

This step is taken chiefly so that the company may have the advantage of the proposal contained in the recent budget announcement of the Chancellor of the Exchequer to reduce the tax on public service vehicles seating more than 8 persons by 20 per cent. if they are fitted with pneumatic tires.

NEW ZEALAND DUNLOP SOLD TO ENGLISH FIRM

The Dunlop Rubber Company of Australia, Ltd., at a meeting of its shareholders held recently in Melbourne, decided to sell its interests in New Zealand to the company in the United Kingdom. It was reported that business in New Zealand, formerly satisfactory, was considerably changed by increasingly keen competition.

The cost of production in Australia does not permit goods manufactured there to be sold in New Zealand profitably, it was said. The new company is now to be known as Dunlop (New Zealand, Ltd.) and is entirely separate from the Australian organization, being controlled entirely by the parent company in England.

BEHARRELL GIVES CAUSE FOR TRUCK PNEUMATICS

In a recent statement, Sir George Beharrell, chairman of the Dunlop Rubber Company, declared that the growth of the use of pneumatic tires on heavy vehicles might be judged from the fact that the weekly production to-day is not far short of the annual production 5 or 6 years ago.

The truck pneumatics which are now being manufactured, he said, are the result of considerable scientific work, and their value in regard to the life and maintenance of vehicles and the reduction of noise and vibration is generally admitted. These advantages, coupled with the rebate which is to come in operation under the Finance Act, have, Sir George believed, stimulated the tendency toward the new form of equipment. Although more pronounced in the country than in London, he asserted that the new giant pneumatics are now being applied to all types of road transport from the light delivery car to the heaviest truck and omnibus.

A new illustrated monthly magazine entitled *Rubber* has just made its first appearance as a regular periodical in England. Its object is to stimulate interest in the increasing uses of rubber, according to the publishers. Herbert Standring is actively associated with the magazine.

FURNISH HORSESHOES WITH RUBBER HEELS

The horses that draw the old stage coach, run by the Midland Omnibus Company, between Birmingham and Lilleshall, England, are now shod with a form of rubber "heels" to enable them to stand up and travel fast on the dangerous and slippery roads they traverse daily. The horses' shoes are fitted with a patent non-slipping rubber pad, the invention of J. Gray of Birmingham.

The pad is in the form of a bar across the shoe, and it enables the horses' feet to get a good grip upon the road surface. It has been found in practice to give the animals an easy passage and to reduce fatigue.

BRITISH TRAFFIC RULES FAVOR PNEUMATIC TIRES

That commercial vehicles in England may be driven at a speed of 20 miles an hour if fitted with pneumatic tires is the substance of a new order issued by Colonel Wilfrid Ashley, Minister of Transport, to take effect October 1. The order, which applies to vehicles of more than two long tons in weight unladen, raises the limit from the previous 12 miles an hour which still remains the rule for trucks equipped with solid tires.

The maximum speed of a heavy vehicle drawing a trailer has been raised from 5 to 12 miles per hour, providing pneumatic tires are used.

DUTCH RUBBER FIRMS IN RECENT AMALGAMATION

In commending the proposed amalgamation between the Java Rubber & Produce Co. Ltd., and the Djaboong (Java) Rubber Estates, Ltd., the directors of the former concern say the principle of amalgamation of small rubber companies into substantial units is in general a desirable step towards a more efficient and economical organization of the rubber producing industry.

The capital of the new company by the issue of shares as purchase price is double the amount of the total capital of the old companies. Further, to provide the necessary working capital for development, a series of £50,000 7 per cent convertible are to be created, of which £35,000 are to be offered forthwith. These companies, however, have very successful records to their credit, and even last year, when the great decline in rubber prices took place, the Java Company paid a dividend of 15 per cent and the Djaboong Estates 10 per cent.

Rubber Upholstered Trams

Street cars of the Portsmouth and Southsea Corporation system in England are now equipped with sponge rubber upholstered seats and with sponge rubber floor covering. The buses of the Southdown Motor Service operating along the southern coast of England also have seats upholstered with sponge rubber.

CATALPO!

Current Crude Rubber Items

TRADING MORE ACTIVE ON RUBBER EXCHANGE

Unusual Drop in Prices Is Halted by Reports of Record August Consumption, and Increase in Sales Brings Busy Days to Exchange.

A SHARP decline in price quotations on the Rubber Exchange of New York at the beginning of the past fortnight was counteracted by the record breaking August report of the Rubber Association of America that 42,927 tons of crude rubber had been consumed in the United States during the month. The market, which had dropped to 17.70 cents, took a sharp turn upward at the rumors of the report and the entry of real buying power advanced the price quickly to 18.50. Subsequent recessions have not been marked, and future positions have remained firm.

The trading during the past half month has been on the average about 60 sales a day greater than during the last two weeks in August. When definite word of the Rubber Association consumption report was received on September 13, sales of 731 lots or 1,827½ long tons were made, representing the biggest day's business since June.

Lack of constructive developments toward the end of the period were responsible for a falling off of interest in trading, and prices declined somewhat in all active positions on commission house and dealer liquidation, combined with some professional hammering Brokers with manufacturer connections seemed inclined, however, to absorb all offerings at the lower figures.

Despite the short month, estimates are being made of a September consumption only slightly under 39,000 tons. Absorption by American manufacturers of anywhere between 405,000 and 420,000 tons for the whole year is predicted by different sources, assuring higher price levels for crude rubber as soon as the supply begins to show any signs of falling behind the demand.

The table below indicates the daily fluctuations in prices on the Exchange and the daily volume of sales.

SIX-DAY WEEK IDEA MEETS OPPOSITION

The suggestion of Maurice Maude, former Malayan planter and a director of several rubber companies, that Sunday tapping be stopped as a humanitarian measure and in order to restrict rubber production, has met with considerable opposition in England. It was Mr. Maude's idea that automatic restriction of this sort would reduce present production of rubber by at least 14 per cent.

Others, however, argue that the Christian Sunday has no significance for the coolie workers who, if orthodox enough, observe their own religious holidays during the week. Thus the additional cessation from work on Sunday might reduce the earning capacity of these natives below the actual level of subsistence. In addition, it is often necessary at certain seasons to carry on harvesting at a rush on tea and rubber estates, and it would be hard to discriminate between the tea and rubber workers.

RUBBER INDUSTRY SAID TO BE PASSING CRISIS

In speaking before the annual meeting of the company, Herbert Wright, chairman of the Eastern International Rubber & Produce Trust, Ltd., declared that it was not realized that the present price of rubber almost coincides with the lowest average that has prevailed since the establishment of the plantation industry.

"It is apparent," he said, "that the present will be one of the most critical periods that we are likely to pass through, since rubber is now selling at near or below the cost of production. The raw material is now competing with reclaimed, and the product from European and American companies with that from native estates. If there is any truth in the doctrine that clean raw material leads to an increase in consumption, raw rubber should soon be in great demand and should, therefore, appreciate in value. If the present low price prevails for a considerable length of time, the plantation industry should benefit considerably."

1929 RUBBER PRODUCTION PLACED AT 678,500 TONS

Although many factors make it difficult to attempt an estimate of the world's rubber production in 1929, a well known British expert has recently put the figure at 678,500 tons. The output for British Malaya is placed at the original standard production figure for 1928, namely 336,990 tons, while Ceylon's total is put at 58,800 tons, the utmost that island could produce in 1926, under an average export allowance of 92½ per cent. India, British North Boroneo and Sarawak are estimated to produce 28,900 tons, the actual output for 1927, and British estates in the Dutch Eash Indies are expected to yield 57,810 tons, giving a total of 482,500 from British plantations.

The balance of 196,000 tons from non-British producers includes 104,000 tons from Dutch estates in the East Indies on the assumption that the 7½ per cent. increase estimated for 1928 will be repeated next year. From native areas 54,000 tons are expected, which is two-thirds of the 1927 figure, and the remaining 38,000 tons is estimated as the amount to come from countries, including wild rubber.

Under the new conditions it is difficult to estimate the Dutch native output, but most Dutch authorities support the view that it will rapidly decline since the native grower, no longer able to afford his tappers a living wage, will have to rely on rubber collected by himself and his family. Labor has recently been leaving the native estates in Sumatra, and it is probable that rubber will have to rise high above the present level before native growers there find it worth while to engage in any large reimportation of coolies.

The same authority figures 1929 consumption of rubber at 605,000 tons, giving an excess production of 73,500 tons.

Amazon Commerce Is Slow

Commerce in Para is generally slack during the third quarter of the year owing to lack of rubber and balata for export. The condition is accentuated by low rubber prices and the fact that exporters are holding unusually heavy stocks. The purchasing power of the Amazon Valley is declining, and its chief hope seems to lie in American concessions.

P. J. Burgess and Sir George Maxwell acted as delegates of the Rubber Growers' Association at the Canadian National Exhibition at Toronto.

Closing Prices on Rubber Exchange of New York, Inc.

FROM SEPTEMBER 5 TO SEPTEMBER 20, 1928

Date		Spot	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sales*
Sept.	5	18.40	18.30	18.50	18.60	18.50	18.50	18.50	18.60	18.80	18.70	18.70	18.80		409
	6	18.30	18.20	18.40	18.40	18.50	18.30	18.40	18.40	18.50	18.60	18.60	18.60	18.60	268
	7	18.10	18.00	18.10	18.10	18.10	18.00	18.10	18.10	18.10	18.20	18.20	18.20	18.40	552
	8	17.90	17.70	17.80	17.80	18.00	17.90	17.90	17.90	18.00	18.10	18.10	18.20	18.20	240
	10	17.70	17.60	17.80	17.90	17.80	17.80	17.90	18.00	18.00	18.10	18.10	18.10	18.20	497
	11	18.00	17.80	18.00	18.00	18.00	18.00	18.10	18.10	18.20	18.30	18.30	18.30	18.30	397
	12	18.50	18.30	18.40	18.40	18.50	18.40	18.40	18.50	18.50	18.60	18.60	18.60	18.60	535
	13	18.30	18.20	18.30	18.30	18.40	18.30	18.30	18.40	18.50	18.60	18.60	18.60	18.60	731
	14	18.20	18.10	18.20	18.20	18.30	18.20	18.30	18.30	18.30	18.50	18.50	18.40	18.50	286
	15	18.20	18.10	18.20	18.20	18.30	18.20	18.20	18.30	18.30	18.30	18.40	18.40	18.40	199
	17	18.30	18.20	18.20	18.20	18.20	18.30	18.30	18.30	18.30	18.30	18.30	18.40	18.40	381
	18	18.30	18.20	18.30	18.40	18.40	18.30	18.40	18.50	18.50	18.50	18.50	18.50	18.50	404
	19	18.20	18.10	18.20	18.20	18.20	18.20	18.20	18.20	18.30	18.40	18.40	18.40	18.40	302
	20	18.00	18.00	18.00	18.00	18.10	18.10	18.10	18.10	18.20	18.30	18.30	18.30	18.40	209

*In lots of 2½ tons each

CATALPO!

AKRON SAFETY ENGINEERS ORGANIZE NEW SOCIETY

Safety engineers connected with Akron rubber companies have organized the Society of Safety Engineers to be affiliated with the national safety movement in promoting safety in industries as well as in communities at large. All safety engineers in Summit County are eligible for membership in the new organization.

Under the auspices of this new group, a safety mass meeting was held at the Goodyear Theatre on September 24 with a large attendance of factory foremen present. The society will hold its next regular meeting on September 27 and will meet thereafter on the last Thursday of every month.

The officers of the organization are: Jack Kidney, safety director, Goodyear Tire & Rubber Company, president; Walter L. Schneider, safety engineer, B. F. Goodrich Company, vice-president; Howard Low, safety engineer, Miller Rubber Company, secretary; and C. L. Hungerford, director of safety and hygiene, Firestone Tire & Rubber Company, treasurer.

Goodrich Leases Coast Building

The B. F. Goodrich Rubber Company has leased a two-story and basement concrete building to be erected on Brannan Street, near Third Street, San Francisco, Cal., it was announced September 1. The lease will run for five years with an option for five more at a gross rental of more than $120,000.

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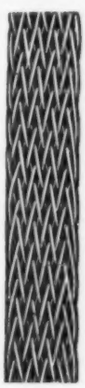

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LATE MARKET PRICES

Crude, Scrap & Reclaimed Rubber - Cottons and Fabrics

NEW YORK, SEPTEMBER 21, 1928

COTTON

A SLIGHT advance in cotton prices during the early days of September was counteracted by the second crop estimate of the Crop Reporting Bureau of the Department of Agriculture, issued on September 8, as of September 1. Little change from the August report was shown, an increase of 151,000 bales being predicted, which indicated a crop of 14,439,000 bales.

According to the Association of Cotton Textile Merchants of New York, the average weekly production of standard cotton cloths during August was only 60,494,000 yards as compared with an average of 72,275,000 yards weekly for the first six months of the year. The International Federation reported that world mill consumption of American cotton during the six months ended July 31 was at the annual rate of only 14,360,000 bales.

These factors all tended to hold down the price during the period, and only the devastating gale that struck Florida and swept north with torrential rains through the Carolinas was responsible for a moderate upturn at the end of the fortnight.

High, low and closing quotations as of September 20 were as follows:

	High Sept. 20	Low	Close	Close Sept. 5
October	17.77	17.52	17.73	18.98
December	17.78	17.54	17.68	18.82
January	17.74	17.51	17.64	18.75

Tire Fabrics

Total consumption of tire fabrics for July reached 20,947,405 pounds, according to the Rubber Association of America. This brings the total for the first seven months of 1928 to 129,888,546 pounds as compared with 177,979,818 pounds for the full year 1927. Late prices, which are slightly lower due to the decline in the cotton market, follows:

CORD				
Peeler, carded, 23/5/3	lb.	.45	@	.46
Peeler, carded, 23/4/3	lb.	.46	@	.47½
Peeler, carded, 13/3/3	lb.	.43	@	.44
Peeler, carded, 15/3/3	lb.	.44	@	.45
Egyptian, carded, 23/5/3	lb.	.53	@	.54
Egyptian, combed, 23/5/3	lb.	.57	@	.58
CHAFERS				
Carded, American, 8 oz.	lb.	.39	@	.41
Carded, American, 10 oz.	lb.	.40	@	.41
Carded, American, 12 oz.	lb.	.40	@	.43
Carded, American, 14 oz.	lb.	.38	@	.43
LENO BREAKER				
Carded American, 8¼ oz.	lb.	.39	@	.43
Carded American, 10¼ oz.	lb.	.39	@	.43
SQUARE WOVEN				
Carded American, 17¼ oz. 23-11 ply	lb.	.46	@	.46½
Carded American, 17¼ oz. 10-5 ply	lb.	.38	@	.40

Sheetings

Even slightly lower prices following the decline in cotton quotations failed to stimulate interest in 40-inch sheetings. The market has continued quiet with late prices as follows:

40-inch, 2.50-yard	yd.	.12¼	@	.12½
40-inch, 2.85-yard	yd.		@	.10¾
40-inch, 3.15-yard	yd.		@	.11⅜
40-inch, 3.60-yard	yd.	.09½	@	.09⅝
40-inch, 3.75-yard	yd.		@	.08½
40-inch, 4.25-yard	yd.		@	.07½

Ducks

Except for a last minute decline in belting and hose ducks, the market has remained practically unchanged during the past half month. Buying has been somewhat more active with steady factory inquiry, and dealers hope to be able to clear up their accumulated inventories. Late quotations follow:

Belting and Hose	lb.	.32	@	.32½
Enameling	lb.	.35½	@	—
Single filling	lb.	.14¼	@	.16
Double filliing	lb.	.17	@	.18

RECLAIMED RUBBER

The market for reclaimed rubber has not changed during the past fortnight except for a slight drop in the prices on black unwashed tire and high tensile red grades. There was a slight decline in the consumption of reclaimed during August but the plants still report production proceeding at high levels with a good demand from consuming factories. Late prices follow:

High Tensile				
Super-Reclaim No. 1 Black	lb.	.12½	@	.13
Super-Reclaim No. 2 Black	lb.	.11½	@	.11¾
High Tensile Red	lb.	.13¼	@	.13½
Shoe				
Unwashed	lb.	.07¼	@	.07½
Washed	lb.	.10	@	.10¼
Tube				
No. 1 (Floating)	lb.	.14½	@	.15
No. 2 (Compounded)	lb.	.11	@	.11½
Tires				
Black, washed		.09½	@	.10
Black, unwashed		.07½	@	.07¾
Black selected tires	lb.	.08	@	.08¼
Dark Gray	lb.	.09½	@	.09¾
Light Gray	lb.	.12	@	.12½
White	lb.	.13	@	.13½
Truck, Heavy Gravity	lb.	.07	@	.07¼
Truck, Light Gravity	lb.	.07¾	@	.08
Miscellaneous				
Mechanical Blends	lb.	.06¾	@	.07½
Red	lb.	.13	@	.13¼

Scrap Rubber

Dealers in scrap rubber report collections better in the more popular grades. A steady demand from reclaimers, however, continues to draw heavily on the accumulations as fast as supplies of scrap come in. Prices have slightly advanced and the latest quotations are as follows:

(Prices to Consumer)

Auto tire peelings	ton	37.50	@	39.00
Standard White auto	ton	50.00	@	52.50
Mixed auto	ton	23.50	@	25.00
Bicycle tires	ton	25.00	@	27.50
Clean solid truck tires	ton	22.00	@	24.00
Boots and shoes	lb.	.01⅜	@	.01½
Arctics, trimmed	lb.	.00⅞	@	01
Arctics, untrimmed	lb.	.00⅜	@	.00⅝
Inner tubes, No. 1	lb.	.07	@	.07¼
Inner tubes, No. 2, compounded	lb.	.04¼	@	.04½
Inner Tubes, Red	lb.	.05½	@	.05⅝
Air Brake Hose	ton	35.00	@	37.50
Rubber Hose	ton	18.00	@	20.00

CRUDE RUBBER

ONLY the record consumption figures of 42,927 tons during August brought the crude rubber market back from a downward trend that had reached a level of 17⅞ cents, the lowest spot quotation for ribbed smoked sheets since May. Lower shipments to the United States, combined with a relaxing of the apprehension over Malayan accumulations, helped to steady the market in the closing days of the fortnight.

Stocks in London, after reaching a low of 31,477 tons, showed an increase of 633 tons by September 15. Stocks of rubber held by dealers in Singapore and Penang, while increasing slightly to 18,971 tons, are still nearly 7,000 tons below the figure for the same time last year.

The ambers and crepes continue to be as strong or stronger than standard ribs, but factory demand for all grades has been steady. It is generally predicted that September consumption will be only slightly under 39,000 tons, and it is not believed that net imports into the country will approach that figure.

Trading both in London and in New York has been active during the two weeks just past and seems destined to continue so for some time to come. Steady buying by strong trade interests is apparent and is regarded as a favorable indication of a definite turn for the better in the rubber market.

Prices on the New York outside market on September 20 were as follows:

Plantations—			
Ribbed Smoked Sheets—			
Spot-Sept.	.18	@	.18⅛
Oct.-Dec.	.18⅛	@	.18¼
Jan.-Mar.	.18⅛	@	.18⅜
First Latex, crepe spot	.18⅞	@	.19⅛
Amber Crepe, No. 2	.18¼	@	.18½
Amber Crepe No. 3	.18	@	.18¼
Amber Crepe, No. 4	.17¾	@	.18
Brown Crepe, Rolled	.17¼	@	.17½
Brown Crepe, Clean, thin	.18	@	.18¼
Brown Crepe, specky	.17 Nominal		
Liquid Latex, per gal.	@ 1.50		
Paras—			
Up-river Fine	.19	@	.19¼
Up-river Medium	Nominal		
Up-river Coarse	.13	@	.13½
Acre Bolivian, fine	.19½	@	.19⅝
Caucho Ball, Upper	.13	@	.13½
Islands, fine	Nominal		
Centrals—			
Central, scrap	.14	@	.14½
Esmeraldas	.14	@	.14½
Balata—			
Block, Colombia	Nominal		
Block, Cuidad	.37	@	.38

LONDON MARKET

Standard Ribbed Smoked Sheets—Buyers			
Spot-Oct.	8⅜	@	8½d
Nov.	8½	@	8⅝d
Jan.-Mar.	8¾	@	8⅞d

SINGAPORE MARKET

Standard Ribbed Smoked Sheets—Sellers			
Spot	8¼	@	8⅜d

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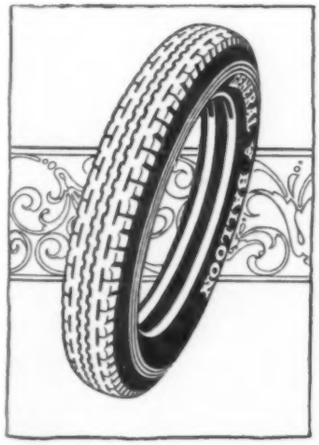

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Accelerators — Colors — Softeners — Compounding Materials

NEW YORK, SEPTEMBER 20, 1928

NO slackening up in the demand for rubber chemicals and compounding materials was apparent during the past half month, and manufacturers have been continuing their high production schedules. With rubber consumption at its peak for all time and tire manufacturers stepping up their output rates to meet the record production of new automobiles, everything points toward a steady market for all producers of the different types of chemical ingredients during the coming fall and winter seasons.

Aside from a slight falling off in the quotations on Heptene, all accelerators and other chemicals remained at the same price levels as recorded two weeks ago. The only marked change to be found was in the case of stearic acid, double pressed, which advanced from 7 to 9 cents a pound. Stearex also responded to this advance and had gained from 4 to 5 cents by the end of the period.

ACCELERATORS

Organic				
A-7	lb.	.55	@	.59
A-11	lb.	.62	@	.66
A-16	lb.	.57	@	.61
A-19	lb.	.58	@	.62
A-20	lb.	.64	@	.68
Aero-X	lb.	.75	@	—
Aldehyde ammonia, crystals	lb.	.65	@	.70
Aniline oil, drums, f.o.b. works	lb.	.15	@	.16¼
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyiguanidine	lb.	.48	@	.50½
Diphenylguanidine	lb.	.40	@	.42½
Ethylidene aniline	lb.	.45	@	.47½
Formaldehyde Aniline, 140° m. p.	lb.	.33	@	.35½
Formaldehyde Aniline, 60° m. p.	lb.	.31	@	.33½
Grasselerator 102	lb.	.58½	@	.61
Grasselerator 552	lb.	—	@	4.45
Grasselerator 808	lb.	.79	@	.85
Grasselerator 833	lb.	1.17	@	1.30
Heptene	lb.	.40	@	—
Hexamethylene-tetramine	lb.	.57½	@	.60
Lithex	lb.	.18	@	.20
Methylenedianilide	lb.	.36	@	.37
Monex	lb.	3.25	@	—
Oynone	lb.	.68	@	.80
Para-Nitrosodimethylaniline, f.o.b. works	lb.	.92	@	.96
Piperidine-Piperidyldithio-Carbamate	lb.	4.45	@	4.60
R & H 40	lb.	.40	@	.42½
R & H 50	lb.	.40	@	.42½
R & H 397	lb.	.75	@	.77½
Safex	lb.	1.20	@	1.25
Tensilac, No. 39	lb.	.50	@	.52½
Tensilac, No. 41	lb.	.50	@	.52½
Thermic F	lb.	.50	@	.55
Thiocarbanilide, drums	lb.	.25½	@	.26½
Thionex	lb.	3.25	@	—
Trimene	lb.	.75	@	—
base	lb.	1.20	@	—
Triphenylguanidine	lb.	.65	@	.70
Vulcanex	lb.	.68	@	—
Vulcone	lb.	.68	@	—
Vulcanol	lb.	1.03	@	1.08
Waxene	lb.	.30	@	.32
Z 88	lb.	.65	@	.69
Inorganic				
Lead, sublimed blue	lb.	.08¼	@	.08¾
Lead, white	lb.	.10¼	@	.12½
Litharge, domestic	lb.	.09½	@	.12
Magnesia, calcined, light	per 100 lb.	5.35	@	5.45
heavy	per 100 lb.	3.65	@	3.75

COLORS

Blacks (See Compounding Materials)				
Blues				
Prussian	lb.	.33	@	.35
Ultramarine	lb.	.06	@	.30
Browns				
Sienna, Italian	lb.	.05	@	.12½
Umber, Turkey	lb.	.04½	@	.07
Greens				
Chrome, light	lb.	.27	@	.31
medium	lb.	.29	@	.32
dark	lb.	.31	@	.34
Chromium Oxide, bbl.	lb.	.34	@	.36
Reds				
Antimony				
crimson, 15/17	lb.	.44	@	.50
sulphur free	lb.	.50	@	.55
golden 15/17 F.S.	lb.	.18	@	.22
Indian English	lb.	.08	@	.12
Domestic (Maroon)	lb.	.08	@	.12
Oximony	lb.	.13¼	@	—
Red oxide, pure	lb.	.10	@	.12
Venetian red	lb.	.03	@	.06
Vermillion, quicksilver,				
English	lb.	1.85	@	1.95
Whites				
Lithophone, Akcolith	lb.	.05 3/5	@	.06
Litnophone, Azolith	lb.	.05¼	@	.05¾
Lithopone, Vanolith	lb.	.05¾	@	—
Titanox	lb.	.10	@	.10½
Cal. Base Pigment	lb.	.10	@	.10½
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (leaded)	lb.	.06⅝	@	.07⅛
Zinc Oxide—French Process				
White seal	lb.	.11⅜	@	—
Green seal	lb.	.10⅞	@	—
Red Seal		.09⅞	@	—
Yellows				
Chrome	lb.	.15½	@	.16½
Ocher, French medium	lb.	.03½	@	.06
domestic	lb.	.01⅝	@	.02

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@	24.50
Ammonia carbonate	lb.	.10½	@	.12
Asbestine	ton	14.75	@	18.00
Barium carbonate	lb.	.03½	@	.05
Barium Dust	lb.	.05	@	.06
Barytes southern off-color,	ton	12.00	@	18.00
Western prime white	ton	23.00	@	—
imported	ton	27.00	@	36.00
Basofor	lb.	.04½	@	—
Blacks				
Arrow "Aerfloted"	lb.	.08½	@	.12½
Bone Black	lb.	.05½	@	.11
Carbon, compressed	lb.	.08	@	.12
Carbon, uncompressed	lb.	.07½	@	.11½
Drop Black	lb.	.06	@	.10
Fumonex	lb.	.06	@	.09
Gastex	lb.	.05¼	@	.05½
Lamp Black	lb.	.12	@	.40
Micronex	lb.	.08½	@	.12½
Velvetex carbon	lb.	.04½	@	.06
Blanc fixe dry f.o.b. works	lb.	.03½	@	.03⅝
Carrara filler	lb.	.01¾	@	.02
Catalpo (fact.)	lb.	.02	@	—
Chalk	ton	12.00	@	14.00
Clay, China, domestic	ton	8.00	@	9.00
Aerfloted Suprex	ton	10.00	@	22.00
Congaree, c. l. f.o.b. mine	ton	9.00	@	—
Mineral Flour, c. l. fob mine	ton	20.00	@	23.00
Tensulite		15.00	@	—
Glues, extra white	lb.	.22	@	.26
medium white	lb.	.20	@	.24
Magnesia, carbonate	lb.	.08¾	@	.11
Mica, powdered	ton	65.00	@	80.00
Rotten Stone (powdered)	lb.	.02½	@	.04½
Soapstone, powdered	ton	15.00	@	22.00
Starch, powdered	cwt.	3.30	@	3.70
Talc, domestic	ton	12.00	@	15.00
Velvetex	lb.	.04	@	.07
Whiting, commercial	cwt.	.85	@	1.00
English cliffstone	cwt.	1.50	@	—
Superfine	ton	10.00	@	12.00
Witco	ton	12.00	@	—
Wood pulp XXX	ton	45.00	@	—
Wood pulp X	ton	25.00	@	—
Zinc Carbonate	lb.	.09½	@	.10½
Zinc Stearate	lb.	.18½	@	.19½

MINERAL RUBBER

Genasco (factory)	ton	50.00	@	52.00
Montezuma, solid	ton	28.00	@	36.00
Montezuma, granulated	ton	32.00	@	42.00
Paradura	ton	62.50	@	65.00
Pioneer, MR, solid	ton	42.00	@	45.00
Pioneer-granulated	ton	52.00	@	55.00
R & H Hydro-Carbon	ton	27.05	@	29.00
Robertson, MR, solid	ton	34.00	@	80.00
M.R. (gran)	ton	38.00	@	80.00

SOFTENERS

Acids				
Nitric, 36 degrees	cwt.	5.00	@	5.25
Sulphuric, 60 degrees	ton	10.50	@	11.50
66 degrees	ton	15.00	@	16.00
Tartaric, crystals	lb.	.35	@	.36
Acids, Fatty				
Stearex	lb.	.15	@	.20
Stearic, double pressed	lb.	.18	@	.22
Alkalies				
Caustic soda, 76%	cwt.	3.76	@	3.91
Soda ash, 58% C.L.	cwt.	1.40	@	
Oils				
Corn, refined, bbls.	lb.	.11	@	.11½
Cottonseed, crude		.08½	@	.08¾
Cycline	gal.	.27	@	.34
Degras (c.l. 100 bbls.)	lb.	.03¾	@	—
Less c. l. (10-25 bbls.)	lb.	.04	@	—
Lots less than 10 bbls.	lb.	.04¼	@	.04½
Fluxrite	lb.	.05	@	.06
Hexalin	lb.	.60	@	—
Acetate	lb.	.70	@	—
Linseed, Raw C.L. bbl.	lb.	.09½	@	.10
Palm Lagos	lb.	.07¼	@	.07½
Niger	lb.	.07¾	@	.08
Vansulol	lb.	.10½	@	—
Para-Flux	gal.	.17	@	—
Peanut, domestic, crude	lb.	.12	@	.12½
Petrolatum, white	lb.	.08	@	.08½
dark amber	lb.	.03⅝	@	.03¾
Pine, steam distilled	lb.	.70	@	
Rapeseed, refined	gal.	1.04	@	1.06
second rectified	gal.	.58	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.06½	@	.07½
coal tar	gal.	.05½	@	.06
pine, 200 lb. gr. wt.	bbl.	9.00	@	10.00
Rosin, grade K, 280 lb. bbl.		8.55	@	—
Pigmentar	gal.	.33	@	.41
Tar Retort, 50 gal.	bbl.	12.50	@	13.00
Solvents				
Acetone, pure	lb.	.13	@	
Alcohol denatured, No. 1 bbls.	gal.	.37½	@	.44½
Benzol, 90%	gal.	.28	@	—
Carbon bisulphide	lb.	.05½	@	.06¼
Carbon tetrachloride	lb.	.06¼	@	.07
Motor gasoline, steel bbls.	gal.	.17	@	—
Naptha, solvent	gal.	.35	@	.40
Turpentine, spirits	gal.	.60	@	.64
wood	gal.	.50	@	.54
Waxes				
Beeswax	lb.	.56	@	.58
Carnauba	lb.		@	.50
Ceresin, white	lb.	.10	@	.11
Montan, crude	lb.	.07	@	.07½
Ozokerite, black	lb.	.24	@	.25
green	lb.	.26	@	.30
Miscellaneous				
RSL Mold Solution	gal.	.75	@	.100

ANTI-OXIDANTS

Antox	lb.	.79	@	.83
Neozone	lb.	.74	@	—
Oxynone	lb.	.68	@	.80
Resistox	lb.	.54	@	.57
Stabilite	lb.	.65	@	—
VGB	lb.	.55	@	.66

SUBSTITUTES

Black	lb.	.08	@	.14
White	lb.	.10	@	.16
Brown	lb.	.08	@	.15

VULCANIZING INGREDIENTS

Sulphur Chloride (drums)	lb.	.03¼	@	.03½
Sulphur flour,				
Superfine bags	cwt.	2.20	@	2.80
Superfine, bbls.	cwt.	2.55	@	3.10
100% pure, refined, bags	cwt.	2.60	@	3.15
bbls.	cwt.	2.95	@	3.50

TIRES & TUBES
CRUDE RUBBER

STATISTICAL SECTION

AUTOMOBILES
GASOLINE

ALTHOUGH a high consumption figure for August had been expected by the industry, the announcement of the Rubber Association of America that 42,927 tons of crude rubber had been absorbed by factories in the United States was little short of startling. Setting a record for all time, this well denoted the healthy state of the industry in this country and was generally accepted as presaging a total 1928 consumption close to 10 per cent higher than the previous record of 1925.

The amount of rubber invoiced to the United States during the first three weeks of September has been considerably below the figures for the last three weeks of August, and September's total imports are expected once again to fall below the amount consumed. This will cause a further reduction in the total stocks of crude rubber on hand in the United States, which totaled only 68,994 tons, or less than two months' supply, at the end of August. This is the lowest figure for rubber stocks in this country since October, 1926.

London stocks continue low, and the formerly feared accumulations in the Far East are losing their influence as a factor in the industry. Attention is being turned, instead, toward the high production rate of American tire factories, the record breaking shipments of tires to dealers, and the tremendous increases in new car production.

Latest figures covering imports and exports from the leading consuming and producing markets have been added to the appropriate tables in this section.

PLAN OF THE SECTION

The statistics included in this section have been chosen for their constant importance to the rubber industry. The tables are reprinted in the same relative position in every issue, each table being kept current by the addition of new figures as soon as they become available. The section accordingly affords the most up-to-date, complete and convenient statistical service in the industry.

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U. S. Imports and Exports of Crude Rubber

	Gross Imports			Re-exports			Net Imports
YEARS	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons
1921	185,394	73,772,677	17.76	5,716	2,414,924	18.86	179,678
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1926:							
Jan.	42,404	72,528,151	76.36	2,059	3,747,505	81.24	40,345
Feb.	32,865	58,733,370	79.78	1,430	2,280,168	71.17	31,435
Mar.	42,152	70,589,581	74.76	1,836	2,735,234	66.51	40,316
Apr.	34,544	48,742,539	62.99	1,128	1,605,093	63.58	33,416
May	29,756	36,896,080	55.35	1,052	1,558,987	66.17	28,704
June	24,900	34,498,561	61.85	1,105	1,371,217	55.41	23,795
July	35,820	33,061,281	41.20	1,554	1,743,854	50.09	34,266
Aug.	27,400	24,670,752	40.21	1,318	1,339,563	45.38	26,082
Sept.	37,112	32,625,032	39.25	1,437	1,519,870	47.20	35,675
Oct.	29,746	25,320,558	38.49	1,366	1,316,270	43.03	28,110
Nov.	39,155	34,890,536	39.78	1,482	1,411,517	42.51	37,673
Dec.	37,754	33,261,366	39.33	1,904	1,841,305	43.16	35,850
1927:							
Jan.	43,340	36,753,719	37.86	1,525	1,444,734	42.28	41,815
Feb.	28,337	23,110,257	36.41	2,451	2,277,297	41.47	25,886
Mar.	35,515	28,693,016	36.07	2,763	3,249,665	52.50	32,752
Apr.	46,202	37,321,505	36.06	1,575	1,428,425	40.48	44,627
May	36,518	30,984,377	37.88	2,782	2,501,562	40.14	33,736
June	33,045	27,850,014	37.62	1,775	1,550,592	39.00	31,270
July	37,677	31,678,259	37.53	1,958	1,560,853	35.59	35,719
Aug.	32,810	26,396,931	35.92	1,809	1,382,768	34.12	31,001
Sept.	33,301	25,314,412	33.94	3,500	3,036,929	38.74	29,801
Oct.	30,184	22,163,282	32.78	2,513	2,042,713	36.29	[illegible]
Nov.	38,592	27,395,428	31.69	2,469	2,014,196	36.43	36,123
Dec.	30,737	22,213,574	32.26	2,655	2,245,754	37.77	28,082
1928:							
Jan.	39,108	30,278,444	34.56	1,988	1,734,990	38.95	37,120
Feb.	33,664	27,763,655	36.82	2,738	2,229,589	36.35	30,926
Mar.	40,688	32,109,376	35.23	3,718	2,587,434	31.07	36,950
Apr.	37,958	27,296,346	32.23	2,272	1,415,024	27.80	35,686
May	31,058	19,058,672	27.80	2,399	1,386,307	25.80	28,659
June	27,764	14,121,219	22.71	2,621	1,400,697	23.86	25,143
July	27,129	11,581,969	19.06	3,087	1,451,446	20.99	24,042
Aug.*	28,584	11,844,710	18.50				
Sept.							
Oct.							
Nov.							
Dec.							

*Official estimates based on arrivals at New York and Boston.

U. S. Consumption of Crude Rubber

(Rubber Association of America statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1921	1922	1923	1924	1925	1926	1927	1928
Jan.	5,045	16,938	30,106	29,058	29,638	32,196	31,518	34,403
Feb.	5,955	14,767	30,149	25,736	29,761	31,136	30,137	33,702
Mar.	9,190	21,408	36,629	28,385	33,498	32,936	36,141	35,688
Apr.	13,084	19,294	29,085	27,129	34,139	32,696	35,871	32,772
May	16,023	23,246	36,155	25,845	35,322	29,364	34,592	37,333
June	16,142	31,713	24,272	22,753	35,822	28,598	33,801	37,676
July	18,310	24,522	17,685	23,396	36,053	27,577	29,219	37,497
Aug.	23,649	29,631	20,359	28,982	35,909	34,533	33,460	42,927
Sept.	16,705	24,410	17,594	31,497	31,691	32,904	27,214	
Oct.	16,814	26,881	21,321	31,520	29,047	29,836	26,790	
Nov.	14,105	24,950	20,437	27,289	28,853	28,080	26,792	
Dec.	15,482	25,070	21,902	27,199	28,748	26,293	25,492	
Totals	170,504	282,560	305,694	328,769	388,481	366,149	371,027	

Figures on Quarterly Basis

Quarter	1921	1922	1923	1924	1925	1926	1927	1928
Jan./Mar.			96,776	87,609	95,263	94,301	99,216	103,558
Apr./June	65,463	127,360	89,493	75,674	104,099	87,109	103,242	103,500
July/Sept.			55,621	83,813	99,493	93,793	89,210	
Oct./Dec.	105,962	155,067	63,617	92,656	85,789	83,212	80,860	
Totals	171,425	282,427	305,507	339,752	384,644	358,415	372,528	207,058

Note—The Rubber Association estimates its monthly rubber consumption figures to be 90 per cent complete. Up until 1925 the quarterly figures were likewise estimated to be 90 per cent complete; beginning with 1925 an estimate of 92 per cent completeness has been used. These estimates have been used in raising the figures in this table to 100 per cent. The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Rubber Invoiced to the U. S.

(Reported by American Consuls—Quantities in Long Tons)

During the Week Ended	From Br. Malaya	From Ceylon	From Dutch East Indies	From London & Liverpool	Total
July 14	4,403	859	2,249	277	7,788
July 21	4,879	384	1,648	320	7,231
July 28	4,685	1,065	2,083	178	8,011
Aug. 4	4,271	692	1,335	1,582	7,880
Aug. 11	4,916	740	2,373	916	8,945
Aug. 18	6,416	776	1,813	944	9,949
Aug. 25	6,932	946	2,340	453	10,671
Sept. 1	5,501	979	1,238	835	8,553
Sept. 8	5,105	236	2,254	295	7,880
Sept. 15	5,086	1,562	1,342	734	8,724

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

1926	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
December	10[illegible]/8	10[illegible]/2	107[illegible]	107[illegible]	10[illegible]/4	—	108	109	109¼	106	10[illegible]/8	10[illegible]/8	—	101	99¼	90¼	98	88⅛	86⅜	—	88⅛	90¼	88⅝	88⅝	—	—	—	91	93	91¼	91¼	98½
1926																																
January		—		87	87¼	85½	86½	87½	87¾	—	89½	88¼	88¼	85½	84½	82½	80½	79½	75½	75	72	72½	—	65	66½	67	69¼	70½	69	—	—	79½
February		67	66¾	66¾	68	68¾	—	—	69	65	66	66	65½	68	68	60½	60	59	59	—	56	55	53	52	51¾	51	51	62¾	—	—	62¾
March		55	58	53	53½	57½	58	56	56½	56½	60	63	61½	62	62	60½	61	62	61	61½	61	60	60	60	60	60	59	58½	58	58	59
April		59	—	59	—	58	56½	56½	53	53	60	63	61½	—	—	60½	62	61	61	61½	61	61	61	61	61	60	60	59½	48½	48½	51¼
May		60	60¼	60	60¼	49¾	49¼	49½	—	49¾	49¾	47¾	50½	48½	47½	48½	47	47½	47½	48½	47¾	48¾	48	48	46	45	45	48	49	—	—	47¾
June		41½	42	41¾	42	41½	41½	41½	41½	42	43	43	—	42	43½	47½	48	47½	47½	47½	46¾	48½	48½	48½	46	45	42	42	42	—	42	42½
July		42	42	42	42	41½	41½	41½	41½	41½	41½	41½	41	40	40	40	40	43	40	41½	41	41½	41½	41½	41½	44	41½	41½	39	39	—	41¼
August		—	88½	88¾	88¾	88¾	89	89	88¾	87½	87½	87½	87½	87½	88¼	88¼	88	88	88	89	89	89½	89½	89½	89	89	89	42½	42½	42½	42½	41¼
September		40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40	40	40¼	40¼	40	40	40	41	42¼	41	41	41	41	41	42¼	42½	42½	42½	42½	41
October		43	—	43	—	43¼	43¼	42¾	42½	42½	42½	42½	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42½	42½	42½	—	42½
November		41¼	—	41	—	41¼	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	41½	42½	42½	42½	42½	—	41½
December		36¾	87½	87½	87½	87½	—	87	87	87¼	87½	87½	—	87¼	87¼	87¼	88	88	88	88	88	88½	88½	88	88	88	87½	87	87	87	86¼	88¼
1927																																
January		—	88½	89	89¼	89¾	40½	40¾	40¾	40¾	40¾	40¾	40	39¾	39¾	39¾	39¼	38¾	38¾	38¾	38¾	38¾	—	88¾	88	88¾	88¾	88¾	88	—	88	88	88¾
February		—	87½	87½	87½	87½	87½	87½	87½	87½	87½	87½	—	88	88	88	88	88¾	88½	88	88½	88	89	89	89	89	89¾	89¾	—	—	89	89¼
March		89¾	89¾	40	40¼	41	40¾	40¾	40¾	40¾	41¼	41¼	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41¾	41	41	41	41¼	41¼	41
April		41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41	41	41	41	41	40¾	40¾	40¾	41	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40½	40½	40½	40¾
May		40½	40¼	40¼	41	41	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾	40¾
June		40%	40¼	40¼	40¼	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½	39½
July		35½	—	35½	—	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼
August		35¼	—	35¼	—	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼
Sept.		34	—	34	—	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½	33½
Oct.		35½	—	35¼	—	35¼	35¼	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾	36¾
Nov.		40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼
Dec.		40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼
1928																																
January		—	87½	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾
February		87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾	87¾
March		89¾	89¾	40	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼
April		41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼	41¼
May		40%	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼
June		35½	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼	35¼
July		34	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾	33¾
August		33%	35¼	35¼	35¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼	36¼
Sept.		40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼
Oct.		40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼
Nov.		40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼
Dec.		40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼	40¼

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1921

Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15
1911	141.30	1915	65.85	1919	48.70
1912	121.60	1916	72.50	1920	36.30
1913	82.04	1917	72.23	1921	16.36

Average Monthly Price per Pound Since 1922

Months	1922 Cents	1923 Cents	1924 Cents	1925 Cents	1926 Cents	1927 Cents	1928 Cents
Jan.	18.82	32.73	25.86	36.71	79.50	38.75	40.25
Feb.	16.12	35.14	25.29	36.01	62.25	38.25	32.75
Mar.	14.53	34.21	22.83	41.00	59.00	41.04	26.82
Apr.	15.99	32.48	22.51	43.64	51.25	40.86	18.97
May	15.25	27.39	18.89	58.47	47.75	40.76	18.99
June	15.11	26.88	18.81	77.26	42.50	37.25	19.59
July	14.67	26.10	22.16	103.16	41.03	23.44	19.40
Aug.	13.93	28.84	26.17	82.99	38.50	35.12	19.46
Sept.	14.44	28.95	27.56	88.88	41.00	33.67	
Oct.	19.78	26.93	31.13	98.01	42.50	34.32	
Nov.	23.88	27.14	34.33	104.80	38.50	37.58	
Dec.	27.42	26.60	37.88	98.51	38.25	40.62	
Average for Year	17.50	29.45	26.20	72.46	48.50	37.72	

London Closing Prices of Ribbed Smoked Sheet

(In Pence Per Pound)

Sixth Restriction Year—Third Quarter

Day	Aug.	Sept.	Oct.	Day	Aug.	Sept.	Oct.
1	9⅝	—	—	17	9½	8⅜	—
2	9⅝	—	—	18	9½	8½	—
3	9½	9	—	19	—	8⅜	—
4	—	8⅞	—	20	9⅜	—	—
5	—	8¾	—	21	9¼	—	—
6	—	8⅝	—	22	9¼	—	—
7	9½	8⅝	—	23	9¼	—	—
8	9½	8⅝	—	24	9¼	—	—
9	9½	—	—	25	9⅛	—	—
10	9½	8⅝	—	26	—	—	—
11	9½	8⅝	—	27	9	—	—
12	—	8½	—	28	9	—	—
13	9½	8⅝	—	29	9	—	—
14	9½	8⅝	—	30	9	—	—
15	9⅜	8½	—	31	9	—	—
16	9½	—	—				

The average price for the period for which the daily prices are reported above is approximately 9.041 pence. All restrictions on rubber exports from British Malaya and Ceylon will officially cease on October 31.

Average Price in Previous Quarters

Quarter	1922-23	1923-24	1924-25	1925-26	1926-27	1927-28
Nov.-Jan.	14.285	14.175	17.9988	46.709	19.265	19.023
Feb.-Apr.	16.858	12.917	19.356	28.103	19.696	12.591
May-July	14.242	10.947	38.469	21.001	18.165	9.154
Aug.-Oct.	14.944	14.632	43.269	20.199	16.620	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Day of Month	Aug.	Sept.	Day of Month	Aug.	Sept.	Day of Month	Aug.	Sept.
1	19.90	——	11	18.90	18.25	21	19.15	——
2	19.70	——	12	——	18.30	22	19.20	——
3	19.85	——	13	18.55	17.80	23	19.00	——
4	19.95	19.05	14	18.95	17.80	24	19.10	——
5	——	19.25	15	19.20	17.80	25	19.10	——
6	19.65	19.35	16	19.35	——	26	——	——
7	19.65	19.40	17	19.10	17.90	27	19.00	——
8	20.40	19.40	18	19.10	17.65	28	19.30	——
9	18.95	——	19	——	17.95	29	19.15	——
10	19.30	18.50	20	18.85	——	30	19.10	——
						31	19.05	——

Average Monthly Price Per Pound

Month	1926 Cents	1927 Cents	1928 Cents	Month	1926 Cents	1927 Cents	1928 Cents
Jan.	20.85	13.42	19.12	Aug.	18.57	20.04	19.28
Feb.	20.60	14.10	18.40	Sept.	17.02	21.95	
Mar.	19.35	14.32	19.38	Oct.	13.14	20.55	
Apr.	19.13	14.75	20.63	Nov.	12.86	20.22	
May	18.92	16.07	21.58	Dec.	12.68	19.58	
June	18.57	16.85	21.50	Average for Year	17.53	17.49	
July	18.71	18.00	21.36				

Stock of Crude Rubber in the U. S.

(All Quantities in Long Tons)

At	ON HAND			AFLOAT			ON HAND AND AFLOAT		
End of	1926	1927	1928	1926	1927	1928	1926	1927	1928
Jan.	55,198	76,172	110,244	46,296	45,312	41,256	100,434	121,484	151,500
Feb.	58,035	91,186	108,955	46,935	42,166	45,316	104,970	133,352	152,271
March	61,822	85,740	114,061	43,567	49,600	39,324	105,389	135,340	153,385
April	55,261	92,757	113,083	41,905	38,963	33,986	97,166	131,720	147,069
May	64,360	94,563	105,356	40,303	44,181	34,374	104,663	138,744	139,730
June	60,460	89,250	90,198	40,907	47,233	40,001	101,367	136,483	130,119
July	64,900	98,469	83,242	38,062	40,587	42,304	102,962	139,056	125,546
Aug.	60,870	96,148	68,994	37,360	40,937	51,875	98,230	137,085	120,869
Sept.	62,078	97,829		42,464	37,966		105,542	135,793	
Oct.	64,089	97,452		52,930	42,804		117,919	140,256	
Nov.	69,385	101,034		47,311	37,076		116,696	138,110	
Dec.	72,520	100,130		52,020	47,938		124,540	148,068	

(Rubber Association of America figures raised to 100%.)

Stock of Crude Rubber in London

(No. of tons in Wharves and Warehouses, including Latex)

At end of:	1920	1921	1922	1923	1924	1925	1926	1927	1928
Jan.	19,300	56,573	67,252	73,498	57,460	27,172	9,994	54,994	66,524
Feb.	18,329	59,439	67,623	70,483	56,732	23,425	10,004	58,826	62,964
Mar.	18,969	63,913	66,670	63,438	55,647	18,104	13,127	63,055	58,272
Apr.	20,072	68,759	68,637	58,770	54,559	12,949	18,773	66,897	53,425
May	20,921	70,403	70,146	54,439	51,615	5,895	20,384	67,169	44,628
June	22,517	69,408	71,597	51,050	51,115	5,318	23,984	63,902	38,756
July	25,346	71,065	71,515	49,937	52,073	4,258	27,727	63,717	35,429
Aug.	30,674	73,211	72,112	58,427	49,700	4,619	30,165	64,491	
Sept.	35,504	72,175	70,977	54,523	44,011	5,453	35,077	68,236	
Oct.	41,743	69,229	68,536	58,891	37,523	5,086	42,138	69,569	
Nov.	45,550	70,786	68,548	60,074	33,593	3,869	44,057	67,050	
Dec.	50,652	69,792	72,299	60,246	29,488	5,697	48,918	63,793	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1927					
October	68,519	70,167	70,916	70,060	69,551
November	69,660	69,501	69,850	67,318	——
December	65,869	66,011	64,761	63,397	63,207
1928					
January	64,360	65,524	65,450	66,285	——
February	65,909	64,945	63,769	63,103	——
March	61,978	61,920	61,033	59,644	58,197
April	58,732	58,945	56,819	53,360	——
May	52,015	50,837	48,705	44,628	——
June	43,716	42,683	41,185	40,083	38,611
July	36,915	35,925	35,238	35,445	——
August	34,294	33,649	32,591	32,815	——
September	31,933	31,477	32,110	——	——

Rubber in Singapore and Penang

(Stocks held by Dealers—Quantities in Long Tons)

End of	1926	1927	1928	End of	1926	1927	1928
Jan.	16,726	25,440	25,868	July	23,101	22,558	18,663
Feb.	13,653	26,766	22,867	Aug.	23,362	25,764	18,971
Mar.	18,389	27,844	20,538	Sept.	25,997	25,178	
Apr.	16,328	24,543	16,946	Oct.	26,614	25,790	
May	16,967	25,133	17,437	Nov.	25,486	28,369	
June	19,416	21,898	18,207	Dec.	26,443	25,798	

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total	Per Cent Balloons		Total	Per Cent Balloons
1922	16,297,735	0.0	1925	26,001,664	66.8
1923	23,140,620	0.6	1926	24,199,524	78.8
1924	21,863,311	19.7	1927	19,700,003	79.1
1928			1928		
January	1,811,534	87.8	July	2,209,692	85.9
February	1,806,437	86.5	August	2,318,898	80.2
March	2,420,084	86.4	September	——	——
April	2,316,324	88.4	October	——	——
May	2,185,592	84.0	November	——	——
June	2,429,453	83.1	December	——	——

U. S. Consumption of Gasoline

(In Barrels of 42 Gallons)

MONTHS	1924	1925	1926	1927	1928
January	11,918,000	14,386,000	17,582,000	17,888,000	20,939,000
February	9,626,000	13,210,000	15,814,000	18,240,000	21,136,000
March	10,961,000	14,890,000	19,302,000	22,464,000	24,041,000
April	14,583,000	19,013,000	20,848,000	23,371,000	25,712,000
May	15,889,000	20,459,000	24,213,000	26,579,000	27,355,000
June	16,421,000	20,724,000	23,803,000	27,799,000	29,022,000
July	18,610,000	22,879,000	24,752,000	29,784,000	30,960,000
August	19,825,000	22,323,000	26,912,000	29,779,000	
September	16,871,000	20,177,000	22,929,000	28,409,000	
October	18,029,000	19,826,000	23,973,000	25,497,000	
November	16,607,000	18,024,000	20,618,000	24,400,000	
December	15,663,000	17,954,000	21,419,000	23,718,000	
TOTAL	185,003,000	223,865,000	262,165,000	297,928,000	

U. S. Tire and Tube Statistics

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1922	1923	1924	1925	1926	1927
Production	40,932	45,259	51,633	60,845	61,237	64,439
Shipments	39,987	45,204	50,120	59,262	59,002	64,059
Inventory[2]	6,132	5,772	7,427	8,142	10,456	10,264

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1926	1927	1928	1926	1927	1928	1926	1927	1928
Jan.	4,587	4,965	5,491	2,974	4,932	5,394	9,947	10,432	9,949
Feb.	4,865	5,095	6,363	3,436	4,458	5,031	11,164	11,075	11,721
Mar.	5,456	6,276	6,819	4,561	5,701	5,731	12,004	11,583	12,389
Apr.	5,846	6,299	6,178	4,980	5,701	5,812	12,461	12,122	12,717
May	5,023	6,151	6,759	5,211	5,657	6,457	12,343	12,462	13,024
June	5,422	6,202	6,692	5,724	6,253	7,117	11,968	12,462	12,162
July	4,950	5,087	6,498	6,337	5,973	7,895	10,592	11,326	11,157
Aug.	5,872	5,752		6,744	6,393		9,732	10,721	
Sept.	5,706	4,822		6,040	5,717		9,318	9,722	
Oct.	5,103	4,773		4,544	4,799		9,917	9,665	
Nov.	4,324	4,502		3,733	4,306		10,297	10,136	
Dec.	4,683	4,497		4,718	4,165		10,456	10,264	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1922	1923	1924	1925	1926	1927
Production	50,850	60,116	70,706	82,614	76,618	70,823
Shipments	49,673	59,072	68,016	81,004	71,591	72,896
Inventory[2]	7,643	8,425	11,052	11,313	16,200	13,692

Figures for Recent Months

	PRODUCTION			SHIPMENTS			INVENTORY		
	1926	1927	1928	1926	1927	1928	1926	1927	1928
Jan.	6,809	5,337	5,441	3,723	6,016	6,072	14,361	15,585	12,982
Feb.	6,825	5,658	6,895	3,736	5,120	5,431	17,090	16,075	14,650
Mar.	7,030	7,184	6,231	4,987	6,157	5,731	19,131	17,096	15,573
Apr.	6,554	7,373	6,661	5,051	6,359	5,702	20,674	17,801	16,638
May	6,149	6,737	7,168	6,304	6,140	6,300	21,141	18,389	17,702
June	6,171	6,306	6,953	6,898	6,832	7,136	20,243	17,858	17,159
July	5,729	5,284	6,674	8,569	7,070	8,729	17,267	16,004	14,974
Aug.	7,424	6,480		9,579	7,983		15,462	14,664	
Sept.	7,590	5,651		7,762	6,758		15,312	13,511	
Oct.	6,208	5,065		5,474	5,024		15,929	13,539	
Nov.	4,852	4,775		4,045	4,723		16,604	13,585	
Dec.	5,277	4,969		5,468	4,712		16,200	13,692	

(1) Rubber Association of America figures, raised to 100%. The Association estimates its figures to be 75% representative or complete when issued and that basis has been accepted when preparing the statistics in this table.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States			Canada			
	Total	Passenger Cars	Trucks	Total	Passenger Cars	Trucks	Grand Total
1921	1,595,304	1,452,902	142,402	66,246	61,098	5,148	1,661,550
1922	2,547,208	2,302,923	244,285	102,053	94,904	7,149	2,649,261
1923	4,020,255	3,631,728	388,527	146,438	129,228	17,210	4,166,693
1924	3,600,918	3,203,049	397,869	135,246	117,765	17,481	3,736,164
1925	4,265,704	3,760,459	505,245	161,389	139,311	22,078	4,427,093
1926	4,298,799	3,808,753	490,046	205,092	164,483	40,609	4,503,891
1927							
Jan.	238,926	199,650	39,276	15,376	11,745	3,631	254,302
Feb.	304,758	264,171	40,587	18,655	14,826	3,829	323,413
March	394,430	345,911	48,519	23,250	19,723	3,527	417,680
April	404,743	357,009	47,734	24,611	20,890	3,721	429,354
May	404,099	357,148	46,951	25,708	21,991	3,717	429,807
June	321,959	278,728	43,231	19,208	16,470	2,738	341,167
July	268,474	236,866	31,608	10,987	8,719	2,268	279,461
Aug.	308,807	274,378	34,429	12,526	10,139	2,387	321,333
Sept.	260,420	226,440	33,980	11,262	8,681	2,581	271,682
Oct.	219,712	183,041	36,671	7,791	6,236	1,555	227,503
Nov.	134,381	109,742	24,639	6,617	5,173	1,444	140,998
Dec.	133,178	105,784	27,394	3,435	2,277	1,158	136,613
TOTAL	3,393,887	2,938,868	453,019	179,426	146,870	32,556	3,573,313
1928							
Jan.	225,039	199,032	26,007	8,463	6,705	1,758	282,502
Feb.	323,368	290,830	32,358	12,504	10,315	2,189	335,872
March	412,825	371,408	41,417	9,724	7,478	2,246	422,549
April	409,948	364,877	45,071	24,240	20,546	3,694	434,188
May	425,990	375,798	50,192	33,942	29,764	4,178	459,932
June	396,967	356,439	40,528	28,399	25,341	3,058	425,366
July	390,445	287,933	52,512	25,226	20,122	5,104	415,671
Aug.	458,429	400,689	57,740				
Sept.							
Oct.							
Nov.							
Dec.							

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA[1]								DUTCH EAST INDIES[5]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon[2]	India & Burma[3]	Sarawak[4]	British North Borneo[3]	Siam[4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China[3]	Amazon Valley	All Other[6]	World Total[7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,955
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	517,523
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1926:															
Apr.	**23,727**	**10,565**	**13,162**	**3,766**	**590**	**679**	**374**	**293**	**4,226**	**4,598**	**6,285**	**410**	**2,318**	**1,529**	**38,230**
May	**31,251**	**10,604**	**20,627**	**3,944**	**691**	**927**	**410**	**279**	**4,440**	**5,358**	**8,737**	**502**	**1,353**	**1,464**	**48,732**
June	**30,624**	**11,764**	**18,860**	**4,208**	**452**	**779**	**512**	**275**	4,444	6,125	10,614	**549**	**1,213**	**1,279**	**49,310**
July	28,824	15,280	13,544	4,422	938	911	498	439	4,618	5,612	13,112	1,521	1,565	1,148	48,328
Aug.	34,625	13,595	21,030	5,666	521	890	476	316	4,132	5,699	10,390	**378**	1,888	1,097	**52,483**
Sept.	35,913	13,972	21,941	6,015	651	888	689	457	4,065	6,568	11,391	681	2,156	822	**56,324**
Oct.	39,367	15,203	24,164	5,672	634	805	475	385	4,058	6,998	11,491	661	1,904	1,023	**58,268**
Nov.	34,302	12,201	22,101	4,228	1,110	685	547	285	3,988	5,816	9,422	718	1,911	1,259	**52,070**
Dec.	36,811	14,716	22,095	6,498	1,176	895	617	338	5,054	7,117	12,786	790	3,821	714	**61,901**
1927:															
Jan.	34,946	14,995	19,951	6,697	921	959	565	304	4,187	6,706	10,690	941	3,482	981	56,404
Feb.	27,528	11,697	15,831	3,571	1,469	552	445	360	4,078	6,526	10,535	675	2,104	1,098	47,244
Mar.	41,346	17,464	23,882	7,142	1,124	997	639	432	5,657	7,004	12,905	733	3,178	1,791	65,484
Apr.	29,041	13,069	15,972	3,349	723	984	452	526	4,666	5,531	10,197	557	2,451	1,520	46,928
May	31,393	15,491	15,902	3,124	760	786	415	348	5,430	5,529	13,410	586	2,460	1,207	49,957
June	32,607	14,706	17,901	3,348	856	1,100	539	409	4,818	5,518	9,109	772	889	1,731	46,990
July	23,947	12,697	11,250	4,018	827	859	544	333	4,771	6,142	11,566	519	1,757	1,113	43,699
Aug.	30,371	17,105	13,266	5,357	688	1,133	623	546	4,355	6,682	12,440	716	1,928	969	48,703
Sept.	29,835	12,095	17,740	4,911	479	645	566	498	3,635	5,957	9,853	497	2,072	1,213	48,066
Oct.	29,846	15,801	14,045	5,245	802	721	591	542	3,810	7,755	13,633	775	2,752	939	51,520
Nov.	28,277	19,860	8,417	4,464	1,277	1,241	591	600	4,127	6,587	14,395	683	2,369	1,627	46,378
Dec.	32,185	17,865	14,320	4,130	1,395	946	592	664	5,763	7,878	13,438	1,191	3,340	1,444	55,101
1928:															
Jan.	27,731	16,618	11,113	4,352	1,605	842	500*	525	4,851	7,988	11,360	720	2,273	1,025	47,154
Feb.	28,813	12,911	15,902	4,353	1,081	667	500*	536	4,052	6,757	8,635	725	1,612	1,276	46,094*
Mar.	27,813	10,508	17,305	3,460	775	645	500*	269	3,999	5,826	9,690	613	2,750	1,211	47,043*
Apr.	20,029	9,335	10,694	3,460	789	630	500*	258	3,998	5,040	5,538	518	1,014	1,323	33,757
May	26,403	10,350	16,053	3,125	654	842	500*	241	4,943	5,355	10,382	619	2,062	1,200*	45,976*
June	22,930	16,168	6,762	3,125	963	926	500*	451	5,419	5,863	13,623	902	1,399	1,200*	41,133*
July	30,405	13,383	17,022	4,798		905	500*	366	5,602	7,566	11,424	744	1,264		
Aug.	35,593	15,114	20,479	5,580								779	1,732		

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, and 2,439 in 1927. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons 1924, 6 tons 1925, 20 tons in 1926, and about ½ ton in 1927. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I" are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons 1924, 2,239 tons 1925, 44 tons in 1926, and 84 tons in 1927. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands. This figure includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. *Figure is provisional; final figure will be shown immediately it becomes available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States*	United Kingdom	France (h)	Germany	Canada (ac)	Japan (ac)	Italy	Russia (ce)	Australia (ed)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	236,977	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	342,378
1920	248,762	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	370,641
1921	179,678	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,562
1922	296,267	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	-3,807	1,778	589	567	395,885
1923	300,372	12,700	27,392	18,519	13,277	15,272	9,489	2,986	1,649	2,184	792	2,528	630	1,128	408,018
1924	317,747	-11,550	30,446	22,727	14,299	19,571	8,764	2,346	2,124	2,688	-807	3,178	944	1,370	414,847
1925	381,815	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	516,493
1926	395,667	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	613,643
1926:															
April	**33,416**	**3,275**	4,121	1,781	1,615	1,868	865	402	505	71	93	335	130	193	**53,670**
May	**28,705**	**6,773**	**2,519**	**1,848**	**1,239**	**1,010**	705	200	468	186	241	225	60	192	**44,871**
June	**23,795**	**5,894**	**2,196**	**1,655**	**1,188**	**1,465**	**1,070**	**983**	636	269	215	303	123	103	**39,895**
July	**34,266**	**6,768**	**2,352**	**2,202**	**1,552**	**1,447**	800	132	702	295	480	292	121	115	**51,524**
August	**26,081**	**7,327**	**2,457**	**2,110**	**1,888**	**1,284**	796	655	1,275	**303**	594	336	90	151	**45,347**
September	**35,675**	**8,843**	**1,774**	**2,029**	**1,355**	**1,922**	819	472	1,241	283	429	317	91	138	**55,388**
October	**28,110**	**9,082**	**3,376**	**2,423**	**1,865**	**2,396**	645	585	1,004	301	2	360	180	121	**49,870**
November	**37,673**	**9,247**	**2,719**	**3,007**	**1,548**	**3,380**	832	568	916	194	-18	358	90	181	**60,695**
December	**35,850**	**4,749**	**2,890**	**2,562**	**1,847**	**856**	439	725	777	248	156	443	151	306	**51,999**
1927:															
January	**41,815**	**10,192**	**3,284**	**2,481**	**1,936**	**1,227**	672	803	929	296	192	316	139	100	**64,382**
February	**25,886**	**7,692**	**3,263**	**3,103**	**2,620**	**1,902**	601	907	460	502	152	336	146	210	**47,780**
March	**32,752**	**9,049**	**2,056**	**3,475**	**3,760**	**1,578**	852	784	780	454	86	385	137	127	**56,269**
April	**44,627**	**7,875**	**2,310**	**2,393**	**1,509**	**2,181**	781	1,972	762	448	58	230	177	218	**65,541**
May	**33,736**	**2,896**	**2,006**	**3,380**	**2,519**	**1,084**	918	887	694	626	-57	335	155	223	**49,402**
June	**31,270**	**2,282**	**2,387**	**3,632**	**2,086**	**798**	942	1,506	557	583	-17	243	164	193	**46,616**
July	**35,719**	**1,116**	**2,384**	**2,899**	**2,104**	**1,505**	**1,007**	415	900	429	66	227	177	236	**49,184**
August	**31,001**	**3,463**	**2,795**	**3,119**	**2,013**	**1,970**	**1,274**	**886**	650	604	-63	312	138	125	**47,785**
September	**29,801**	**7,800**	**1,956**	**2,891**	**1,850**	**2,025**	684	518	772	552	-33	451	155	272	**49,694**
October	**27,671**	**5,888**	**3,479**	**4,202**	**1,790**	**1,966**	**1,021**	**1,075**	908	465	156	401	153	363	**49,538**
November	**36,123**	**1,687**	**3,661**	**4,209**	**1,916**	**1,575**	**1,167**	**1,312**	836	749	298	474	246	317	**54,570**
December	**28,082**	**309**	**4,696**	**3,108**	**2,302**	**2,710**	**1,462**	**1,453**	**1,242**	784	-202	514	268	300	**47,028**
	398,483	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,492	636	4,224	2,055	2,672	627,785
1928:															
Jan.	**37,120**	**1,921**	**1,764**	**2,485**	**2,290**	**1,361**	**760**	**995**	**802**	**589**	**52**	**261**	**335**	**376**	**51,111**
Feb.	**30,926**	**3,143**	**2,526**	**2,984**	**2,553**	**1,258**	**437**	**159**	**616**	**599**	**98**	**307**	**296**	**297**	**46,199**
Mar.	**36,970**	**3,179**	**1,902**	**3,521**	**2,989**	**1,707**	**763**	**1,468**	**918**	**816**	**95**	**351**	**497**	**398**	**55,574**
April	**25,686**	**—2,280**	**2,204**	**2,719**	**1,938**	**2,353**	**1,115**	**926**	**882**	**575**	**280**	**339**	**304**	**159**	**47,150**
May	**28,659**	**—5,223**	**3,210**	**2,944**	**2,186**	**2,306**	**1,095**	**744**	**655**	**746**	**209**	**485**	**220**	**213**	**38,343**
June	**25,143**	**—3,031**	**4,550**	**2,968**	**2,632**	**2,119**	**984**	**710**	**348**	**743**	**133**	**346**	**251**	**182**	**38,078**
July	**28,170**	**—1,374**		**3,387**	**2,692**			**660**	**591**	**895**	**395**				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—German, United Kingdom, and United States exports to Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. *United States imports of guayule are not included in this compilation; such imports amounted to 4,305 tons in 1926 and to 5,019 tons in 1927.

BOOK REVIEWS

RUBBER CHEMISTRY AND TECHNOLOGY. Vol. I, No. 2. Published under the auspices of the Rubber Division of the American Chemical Society. July, 1928. 232 pp.

Having as its object the presentation in convenient form under a single cover all important published papers on fundamental research, technical developments and chemical engineering problems relating to rubber or its allied substances, this quarterly publication should be of interest to all rubber technologists. It contains a review of Rubber Division activities with the minutes of recent meetings and a survey of all recent literature on the chemistry of rubber. There are 21 reprinted papers on all phases of rubber technology making up the body of the volume.

ZINC PIGMENTS. Published by the New Jersey Zinc Company, New York City. August, 1928. 28 pp.

This booklet contains much interesting data intended to be of value to the rubber industry. In addition to historical comment and descriptions of various zinc oxides, it includes a table of the bulking values of dry pigments and a table of the bulking values of various liquids.

CHEMICAL SPECIFICATIONS YEARBOOK. Published by Chemical Specifications, Inc., New York City. 1928. 250 pp.

Useful to all people interested in chemicals, either from a technical or a practical point of view, this volume contains detailed specifications of over 300 chemicals in everyday use in the manufacturing field. Descriptions of containers and shipping regulations are among the most important data included.

United States Imports of Guayule Rubber and Related Gums

(All quantities in Long Tons)

	Guayule		Balata		Jelutong		Gutta Percha	
	Tons	Dollars	Tons	Dollars	Tons	Dollars	Tons	Dollars
1919	1,430	760,690	727	937,038	8,332	2,213,964	2,900	1,068,698
1920	758	345,985	1,064	1,260,043	5,672	2,068,501	3,183	1,520,309
1921	58	26,945	814	1,077,859	1,745	351,893	985	333,564
1922	127	57,040	812	978,765	2,335	403,812	818	281,012
1923	1,155	542,227	700	898,524	4,565	853,308	912	375,167
1924	1,356	536,392	464	568,456	6,165	1,237,100	1,408	463,610
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	1,603	629,284
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	1,445	661,156
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,494	728,172
1928:								
Jan.	432	242,339	27	24,218	588	183,705	150	86,702
Feb.	489	281,295	33	32,165	403	142,621	312	215,085
Mar.	575	365,927	32	26,460	829	388,616	115	57,833
Apr.	512	312,131	47	32,924	592	174,970	68	27,627
May	452	283,414	—	—	679	226,064	100	42,762
June	424	220,081	9	6,799	293	91,152	28	12,374
July	191	100,342	123	46,747	373	113,295	81	27,344

Reclaimed Rubber in the United States

(All Quantities in Long Tons—100% Basis)

Year	Production	Consumption	% to Crude	Stocks*	Year	Production	Consumption	% to Crude	Stocks*
1919	81,366	73,535	36.3	.....	1924	80,079	76,072	22.4	.....
1920	86,395	75,297	38.4	.....	1925	132,930	137,105	35.6	13,203
1921	36,725	41,351	24.1	.....	1926	180,582	164,500	45.9	23,218
1922	57,834	54,458	19.3	.....	1927	189,144	178,471	47.6	24,980
1923	74,766	69,534	22.7	.....					
1927:									
Jan.	16,526	12,374	39.3	25,903	July	15,488	13,842	47.4	26,599
Feb.	15,860	14,424	47.8	27,291	Aug.	15,109	15,836	47.3	25,157
Mar.	16,788	13,528	37.4	27,124	Sept.	14,392	14,790	54.3	23,429
Apr.	14,483	16,677	46.5	25,712	Oct.	16,127	17,292	64.5	22,176
May	16,159	15,754	46.1	26,419	Nov.	15,477	14,876	55.5	21,728
June	16,652	15,547	46.0	25,811	Dec.	16,083	13,431	52.7	24,980
1928:									
Jan.	14,862	18,134	52.7	21,941	July	17,278	17,173	45.9	17,305
Feb.	15,291	16,808	49.9	20,848	Aug.	19,049	15,532	36.2	15,881
Mar.	17,069	18,619	52.2	19,558	Sept.				
Apr.	15,393	17 355	52.9	19,283	Oct.				
May	18,945	18,201	48.8	18,137	Nov.				
June	18,781	16,328	43.4	18,70	Dec.				

*Stocks on hand at the end of month or year. Exports of reclaimed rubber, not shown in this table, amounted to 8,540 tons in 1927.

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